REPORT

OF THE

FEDERAL TRADE COMMISSION

ON

COMMERCIAL WHEAT FLOUR MILLING

▼

September 15, 1920

WASHINGTON
GOVERNMENT PRINTING OFFICE
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FEDERAL TRADE COMMISSION.

VICTOR MURDOCK, *Chairman.*
HUSTON THOMPSON.
WILLIAM B. COLVER.
NELSON B. GASKILL.
JOHN GARLAND POLLARD.
J. P. YODER, *Secretary.*

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CONTENTS.

LIST OF TABLES.

LIST OF EXHIBITS.

MAPS.

LETTER OF TRANSMITTAL.

FEDERAL TRADE COMMISSION,
Washington, September 15, 1920.

TO THE CONGRESS OF THE UNITED STATES:

There is submitted herewith a report of the Federal Trade Commission on commercial wheat-flour milling. This inquiry had its origin in connection with the general food investigation made by the Commission, but was later continued as a separate inquiry.

The wheat-flour milling industry has long been one of the most important in the United States. The value of its flour output alone, in the eight months ending with March, 1920, considerably exceeded a billion dollars. The growth of the industry has been relatively slow, however, for many years. In 1899 the mills produced a little over 100,000,000 barrels of flour; in 1919 about 120,000,000 barrels. While the wheat-flour output increased less than 20 per cent, population grew at twice that rate, cotton used by the cotton mills of the country more than doubled, and there was a threefold increase in the production of pig iron.

Although there are still thousands of small neighborhood mills in the United States, and although the largest milling concern in the country has never produced much, if any, over 10 per cent of the total output, the tendency toward concentration in the wheat-flour industry is notable. The crowding of consumers into limited areas incidental to the great industrial development of the country has created a situation in which a demand for standardized brands of wheat flour has been developed. Such flour can be produced successfully only by milling concerns of large size whose wheat supply enables them to maintain the quality of their flour practically unchanged from year to year. Concentration has been further advanced by the increased production of hard wheat on the high plains west of the Mississippi River. The flour made from this wheat by the western mills satisfies the demands of consumers in the great industrial centers much more fully than does the flour produced from the soft wheat grown in other sections of the country. The low price of wheat produced in the Pacific Northwest has also developed a surplus output of wheat flour in that section, which finds its market principally in California and abroad.

This concentration in the wheat-flour industry has already progressed so far that 10 of the larger milling concerns probably have

sufficient capacity to produce over half of the wheat flour used in the United States. Its rate of progress in recent years is indicated by the fact that in the 10 years from 1904 to 1914, according to census statistics, one out of every three mills having an annual output of 5,000 to 20,000 barrels went out of business, their number decreasing from 2,123 to 1,377. On the other hand, the number of mills making over 100,000 barrels increased from 166 to 218, their output in 1914 amounting to over 60 per cent of the total for the entire country.

During the 20 years ending with 1914 the price of wheat flour did not advance nearly so much as the average price of other commodities. According to census statistics, the average value of wheat flour at the mills in 1889 was $4.33; in 1899, $3.35; and 1909, $5.20; but in 1914 it had dropped back to $4.67. In the five years from 1913–14 to 1917–18, the average price of flour sold by the companies covered in the present report increased from $4.15 to $10.22 per barrel—an advance of 146 per cent. During the same period, according to estimates of the Department of Agriculture, the average price received by farmers for wheat advanced 160 per cent, while price data of the Department of Labor indicate an increase of only 118 per cent in retail prices of flour. It should be noted also that for the same companies the millers' combined receipts for flour and feed increased only 134 per cent. The wholesale price of flour has continued to increase, and by the end of 1919 its advance over the low level of the nineties was relatively greater than the average advance for all other commodities. Furthermore, the retail price of flour advanced during 1919 at practically three times the average rate for other foods.

Incomplete data gathered by the Commission indicate that up to 1918, profits of flour jobbers, including proprietors' salaries, ranged from 10 cents to 20 cents per barrel, but that many jobbers probably made twice their ordinary profit in 1917. The average expense in jobbing a barrel of flour apparently increased from about 25 cents before the war to about 40 cents in 1917 and 1918.

The circumstances under which this inquiry into the wheat-flour industry was carried on made it advisable to limit the report largely to the operations of 37 companies whose annual sales in 1913–14 amounted to 38,450,000 barrels, in 1915–16 to 43,430,000, and in 1917–18 to 34,659,000. Their sales, however, are so widespread and are such a large factor in the interstate flour trade that their prices may be taken as representative of commercial milling operations throughout the United States. Ten of these concerns included in what is referred to hereafter as the Northwestern group used hard spring wheat almost exclusively; 13 in the Southwestern group used hard winter wheat for 85 per cent of their output, and 14 in the Eastern

group divided their consumption quite equally between hard and soft wheat.

The accounting records, even of the 37 selected companies, were not found to be wholly satisfactory for use in determining past developments or present conditions in the industry. After careful revision it was possible, however, to obtain figures for the 37 companies and for the different groups referred to above which can be used with confidence in comparing different years and different groups of companies.

On flour sales amounting to $159,656,875 the 37 companies made a profit of $5,512,163 in 1913–14, and in 1917–18 on sales amounting to $354,192,287 their profit was $22,440,858.* The rate of profit on sales increased from 3.4 per cent in 1913–14 to 6.5 per cent in 1916–17 and dropped back to 5.3 per cent in 1917–18. The decrease in the last year was due in part to sales to the Government at less than cost.

This remarkable development of the business of the 37 companies resulted in an increase in their investment from $43,460,780 at the beginning of the five years to $69,528,605 at its end. These concerns not only made this increase of 60 per cent in their investment but also paid out $36,716,403 in dividends and Federal taxes and for outside investments.

The average annual earnings of the Northwestern group on its average investment for the five years were 24.4 per cent; those of the Southwestern, 23.5 per cent; but those of the Eastern group amounted to only 15.8 per cent. The profit of the 37 companies was over twice as large in the last two years as in the first three. In 1916–17 their return on investment, 38.4 per cent, was over three times as large as in 1913–14. In the single year 1916–17 the profit of the Northwestern group amounted to 44.7 per cent and in 1917–18 that of the Southwestern group was 42.6 per cent. In striking contrast with these figures, the earnings of the Eastern group in 1915–16 were only 6.5 per cent. In 1917–18, however, the profit of that group had increased to 30.8 per cent.

Segregating wheat-flour costs from costs of other products as accurately as possible, and allowing a credit from feed sales of 76 cents in the first year and $1.29 in the last, the cost per barrel of flour for the 37 companies increased from $3.99 in 1913–14 to $9.68 in 1917–18. In the first year mentioned this cost included $3.96 for wheat and 79 cents for all other items and the last year $9.72 for wheat and $1.25 for other items. The increase in cost of wheat was $5.76 and that in the cost of all other items 46 cents. The cost of wheat advanced 146 per cent during this period, packages 74 per cent, mill operating costs 68 per cent, and general and selling

*After this report went to press the Commission learned that $1,297,384.05 of this $22,440,858 was paid to the Grain Corporation as excess profits.

expenses 37 per cent. This great increase in the cost of wheat is explained largely by the fact that the average crop in 1916 and 1917 was practically 400,000,000 bushels smaller than that in 1915 and that, in spite of greatly decreased exports, wheat on hand at the end of the crop years fell off 122,000,000 bushels in 1916–17 and 34,000,000 bushels in 1917–18. On July 1, 1916, estimated stocks of wheat in the United States amounted to 177,000,000 bushels and two years later to only 21,000,000 bushels.

Until 1917–18 miscellaneous milling was a negligible factor in the operations of the 37 companies, but on account of their increased output of coarse grain products in that year a satisfactory separation of wheat-flour investment from the increased miscellaneous milling investment would have been desirable but was impossible. Therefore, wheat-flour profits and miscellaneous milling profits were necessarily combined in ascertaining the rate of return on investment for that year. Average investment per barrel for the 37 companies thus determined increased from $1.14 in 1913–14 to $1.90 in 1917–18 and profit per barrel from 14 cents to 65 cents.

In 1913–14 the per barrel investment of the Northwestern group was 14 per cent below and that for the Eastern group 53 per cent above the average for the 37 companies, but in 1917–18 the investment for the Northwestern group was only 6 per cent below and that for the Eastern group only 14 per cent above. The investment for the Southwestern group held an intermediate position in all years Costs and prices per barrel for the different groups showed this same tendency to approach each other during the five-year period.

The data used in this report on the whole seem to indicate that milling companies of less than 300,000 barrels' annual output are relatively less profitable than the larger companies. Among the companies having an output over 300,000 barrels, those with an output below 1,000,000 compare favorably with those having an output in excess thereof.

Respectfully,

Victor Murdock, *Chairman.*
Huston Thompson.
William B Colver.
Nelson B. Gaskill.
John Garland Pollard.

COMMERCIAL WHEAT-FLOUR MILLING.

Chapter I.

GENERAL SURVEY.

Section 1. Origin and scope of the report.

This inquiry had its origin in connection with the general food investigation made by the Commission, but was later continued as a separate inquiry.

It includes a general survey of flour milling in the United States and a discussion of changes in prices, costs, and profits during the years 1913–14 to 1917–18, based on data collected from the records of a relatively small number of large milling companies. These mills, however, produce so large a part of the flour sold in the commercial flour markets of the United States that prices of flour throughout the country are greatly influenced thereby. The milling situation on the Pacific coast is also discussed briefly.

Section 2. Commercial importance of wheat flour.

Wheat flour has always held an important place not only in the domestic but also in the foreign commerce of the United States. Available data indicate that during the last 20 years the mill value of the annual output has ranged from $300,000,000 to over $1,000,000,000, and in recent years consumers in the United States have paid much in excess of the latter amount for their supplies of wheat flour.[1]

The commercial importance of flour indicated by this large volume of sales is the more significant because it is an article of general consumption and must consequently be carried in stock by a very large number of merchants. The increasing concentration of flour mills in recent years has involved large and constantly increasing expenditures for freight, storage, and cartage. Data from the Interstate Commerce Commission indicate that fully 80 per cent of all flour now made is shipped by rail (see Exhibit I). The consumer must necessarily pay these increased charges.

[1] See United States census statistics for the flour and grist mill industry and the Northwestern Miller, Jan. 7, 1920, p. 56.

The average annual exports of flour and of wheat by decades for the last 50 years, as shown in the following statement,[2] indicate the importance of the foreign demand for these products:

Fiscal years.	Flour.	Wheat.
1870–1879	$23,633,151	$68,680,285
1880–1889	46,533,323	97,788,699
1890–1899	63,381,926	80,442,686
1900–1909	62,231,967	66,723,817
1910–1919	104,396,359	162,792,450

The average figures by decades do not bring out the advantage to the United States of this foreign market in years when the wheat crop is much in excess of domestic requirements. As early as 1892 flour exports amounted to $75,000,000. This figure was duplicated in the following year, but was not exceeded until the opening year of the European War, 1914–15. For over 10 years the general tendency was for the wheat crop to shrink to the level of home consumption, and in the fiscal year 1905 exports of flour amounted to only $40,000,000—less than they had been in any year since 1886. Wheat exports also reached the very low amount of $4,000,000 in that year. The very small exports of flour and wheat in 1905 were due to the small crop—552,000,000 bushels—in the preceding year. This was less than had been raised in 1891 before hard winter wheat had become such an important part of the total crop.

A fairly steady increase in the hard winter-wheat crop of Kansas and neighboring States, together with the recent revival in soft-wheat production in the North Central States, has been principally responsible for the increase in the wheat harvest, which by three-year averages of official estimates was as follows: [3]

	Bushels.
1897–1899	621,277,000
1902–1904	620,095,000
1907–1909	660,689,000
1912–1914	794,888,000
1917–1919	831,581,000

This increase in the available supply of wheat made it possible to export $428,000,000 [4] worth of wheat and flour in the fiscal year 1915, not far from 10 times the amount exported 10 years earlier and equal to a sixth of the total exports of domestic products.

Section 3. Production and consumption of wheat flour in the United States.

PRODUCTION.—Definite information as to the flour output of the United States is confined to the reports of the Bureau of the Census

[2] Statistical Abstract of the United States, 1918, p. 787; Monthly Summary of Foreign Commerce, June, 1919, p. 33.

[3] Department of Agriculture estimates. The department publishes revised estimates for some of these years, but the series of estimates referred to is considered the best for comparisons covering the 20 years.

[4] Statistical Abstract, 1918, pp. 784, 787.

and the United States Grain Corporation. The census reports give the number of barrels and value of flour produced in the census years 1889, 1899, and 1909. They also furnish the same information as to the output of merchant mills for the census years 1899, 1904, 1909, and 1914.[5] The output in barrels and the bushels of wheat used each year is shown in the following table:

TABLE 1.—*Production of wheat flour in the United States, as reported by the Census, 1889, 1899, 1909, and 1914.*[1]

	Bushels of wheat used.	Barrels of flour produced.	Bushels used per barrel.
All mills:			
1889	385,749,798	80,948,977	4.77
1899	489,914,004	103,524,094	4.78
1909	503,468,556	107,108,461	4.70
Merchant mills:			
1899	471,306,986	99,763,777	4.72
1904	494,095,083	104,013,278	4.75
1909	496,480,314	105,756,645	4.69
1914	545,728,431	116,403,770	4.69

[1] Data for 1889 taken from Census Bulletin, Flouring and Grist Mill Products, 1902, pp. 9 and 13; for 1899, 1904, and 1909, Census Bulletin, Statistics for the Flour-mill and Gristmill Industry, 1909, p. 13; for 1914, Census of Manufactures, Flour-mill and Grist mill Products, 1914, p. 12.

The Grain Corporation reports show a production of 115,373,723 barrels in 1917–18, 121,130,000 barrels in 1918–19, and 121,636,000 barrels in the eleven months ending May 28, 1920.[6]

The figures in the table above are, of course, open to the objection that the census years may not be typical years. They, however, probably warrant the statement that in the 25 years following 1890 flour production in the United States increased between 40 and 50 per cent. Compared with other data they indicate that wheat-flour milling made relatively slow progress. They show, for example, an increase of only 41 per cent in bushels of wheat used in flour mills between 1889 and 1914. But over the same period population increased 61 per cent, bales of cotton used in American cotton mills, 159 per cent; the output of pig iron over 200 per cent, and that of coal over 250 per cent.[7]

One of the most interesting facts brought out by the table is that, taking wheat the way he buys it and the way he mills it, the American miller is able, year after year, to make a barrel of flour from 4.7 bushels. The maximum consumption, 4.77 bushels in 1889, is less than 2 per cent above the minimum, 4.69 bushels, shown for merchant mills in 1909 and 1914.

[5] The Census of 1870 reported 32,079,144 barrels of flour made in merchant mills. Such evidence as is available indicates that the figure would be considerably larger if on a comparable basis with the figures in the table. For this reason it was not included in the table. No flour output was reported by the Census of 1880. Census, 1870, vol. 3, p. 599.

[6] Grain and Flour Statistics During the War, United States Grain Corporation, p. 27; United States Grain Corporation Bulletin, dated June 8, 1920.

[7] Statistical Abstract of the United States, 1918, pp. 776, 813, 814, and 818.

CONSUMPTION.—The people of the United States consume annually for all purposes about 1 barrel of flour per capita. It is not probable that consumption of flour in this country has ever been materially in excess of that amount for any considerable period. In some European countries, notably France and Belgium, per capita consumption of flour has been greater by about 50 per cent.[8]

The statisticians of the Food Administration compiled data on the wheat supply of the United States and its uses for the purpose of determining the quantity of wheat consumed as flour in the United States. Comparisons of their compilation with census reports indicate that from 4 to 8 per cent of their figure for bushels of wheat consumed as flour is probably in reality wasted in storage and transportation and rejected as unfit for milling. In spite of this probable exaggeration of the actual figures their results are the best available estimate of per capita consumption of wheat as flour over a series of years. Consequently they have been used in the following table, together with their equivalents in barrels of flour.

TABLE 2.—*Per capita consumption of flour in the United States, by fiscal years, 1901–2 to 1917–18.*

Year.	Per capita consumption.		Year.	Per capita consumption.	
	Bushels.	Barrels.		Bushels.	Barrels.
1901–2	5.43	1.13	1909–10	5.09	1.06
1902–3	5.08	1.06	1910–11	5.02	1.05
1903–4	5.34	1.11	1911–12	4.95	1.03
1904–5	5.40	1.13	1912–13	4.94	1.03
1905–6	5.55	1.16	1913–14	5.21	1.09
1906–7	5.43	1.13	1914–15	4.82	1.00
1907–8	5.20	1.08	1915–16	4.97	1.04
1908–9	5.54	1.15	1916–17	4.70	.98
			1917–18	4.55	.95
Average, 8 years	5.37	1.12	Average, 9 years	4.91	1.03

These figures are based on a series of estimates and are presented merely as approximations, which, over a series of years, however, show tendencies with sufficient accuracy for practical purposes. They leave little doubt, for example, that the per capita consumption of flour was about 1 barrel annually during the first decade of the present century—probably in most years somewhat more than that. They establish more certainly, however, a tendency to decreasing consumption, which, together with the war emergency, resulted in an average for the second period covered by the table practically 10 per cent lower than for the first. It would not be at all safe, however, to try to establish the degree of economy in flour consumption on account of the war by a comparison of the figures shown for recent years.

[8] Statistical Notes on Cereals, June, 1919, International Institute of Agriculture, p. 15.

Section 4. Flour mills and flour milling in the United States.

DEVELOPMENT OF THE FLOUR AND GRIST MILL INDUSTRY.—From 1850 to 1900, according to the census, investments in flour and grist mills (data for flour mills alone are not available) increased in round numbers from 54 to 219 million dollars. This fourfold increase in capital was accompanied by a threefold increase in wages from 6 to 18 million dollars, an increase in value of output from 136 to 561 millions, and in cost of materials from 113 to 476 millions. The greatest relative increase was in cost of materials, the least in cost of labor.[9]

The number of mills reporting increased from 11,891 in 1850 to 25,258 in 1900, but these figures have little significance, because the flour mills whose investment, product, etc., constituted a very large and increasing part of the preceding figures throughout the period may have constituted a much larger part of the total number of mills reporting in 1850 than in 1900. In the census of 1900 the segregation of flour mills from the other mills was undertaken, and it was found that of the 25,258 mills reporting only 13,188 made flour. Of the total number of mills 9,476 were merchant mills—that is, mills that buy cereals and sell flour and other cereal products. The progress of these merchant mills from 1899 to 1914 is shown in the following table.[10]

TABLE 3.—*Development of merchant milling in the United States as reported by the census, 1899, 1904, 1909, and 1914.*

	1899	1904	1909	1914
Number of establishments	9,476	10,051	11,691	10,788
Persons engaged in the industry	(1)	59,623	66,054	65,635
Capital	$189,281,330	$265,117,434	$349,151,779	$380,257,420
Salaries and wages	$21,543,154	$27,174,553	$33,981,153	$40,963,303
Salaries	$5,257,991	$7,352,357	$12,516,767	$16,370,141
Wages	$16,285,163	$19,822,196	$21,464,386	$24,593,162
Rent and taxes	(1)	[2] $2,196,945	[2] $2,754,128	[3] $3,798,482
Cost of materials	$428,116,757	$619,971,161	$767,576,479	$752,270,021
Value of products	$501,396,304	$713,033,395	$893,584,405	$877,679,709
Value added by manufactures [4]	$73,279,547	$93,062,234	$116,007,926	$125,409,688
Grain ground, bushels [5]	729,061,820	754,945,729	806,247,961	818,929,321

[1] Figures not available.
[2] Exclusive of internal-revenue taxes.
[3] Including internal-revenue taxes.
[4] Value of products less cost of materials.
[5] Includes wheat, corn, rye, buckwheat, barley, and oats.

NEIGHBORHOOD MILLS.—The census bulletins for 1899 and 1909 give some separate data for the small mills that grind for a toll, or charge, called custom mills. In 1899 their output was 3,760,317 barrels; in 1909 only 1,351,816 barrels. But among the mills classified by the census as merchant mills there are many that have no real standing in commercial flour markets. For example, in 1909 the output of 1,721 mills listed as merchant mills amounted to only 661,839 barrels—not much more than a barrel per day for each mill.

[9] Census Bulletin: Flouring and Grist Mill Products, 1902, pp. 3, 4.
[10] Census of Manufactures, 1914, Flour-mill and Gristmill Products, p 3.

In 1914 a group of 1,821 of these mills made only 717,020 barrels. In neither year was the average daily output per mill as much as one and one-half barrels. These mills may well be classed together with the custom mills as neighborhood mills. This entire group of neighborhood mills still numbers several thousand, but it made less than 2 per cent of the country's output of flour in 1909.

COMMERCIAL MILLS.—Excluding the neighborhood mills discussed on the preceding page, the census classification shows a group of mills numbering 6,413 in 1904 and decreasing to 5,055 in 1914, which, to distinguish them from the neighborhood mills, are termed commercial mills in this report. In all probability many of the 5,055 mills included in this group in 1914 sell no flour outside their own immediate neighborhood, and if a close classification were possible the number of mills whose output exercises any considerable influence in the commercial flour markets would be found to be very much less than 5,000. Nevertheless, the operations of flour jobbers, and cooperative marketing by the small mills themselves, is said to cause their accumulated offerings to influence the market in some degree at times. The number of commercial mills thus classified, and their wheat-flour production in 1909 and 1914, are shown by States in the following table:

TABLE 4.—*Number and production of commercial mills, by States, as reported by the census, 1909 and 1914.*[1]

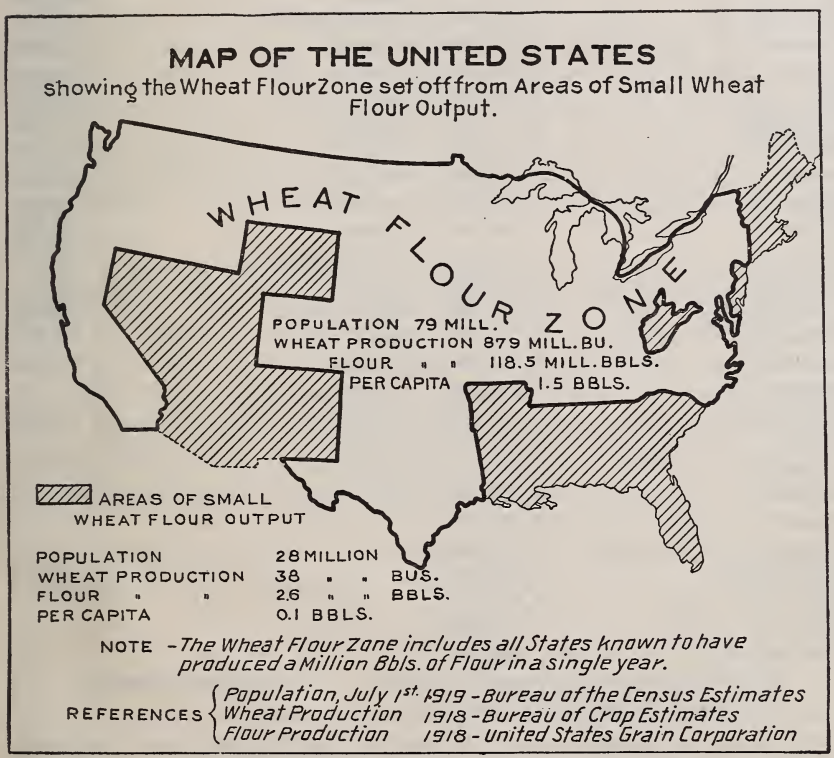
State.	1909		1914	
	Number of establishments.	Barrels produced.	Number of establishments.	Barrels produced.
Minnesota	248	22,771,362	211	27,117,914
Kansas	209	10,879,028	172	12,772,478
New York	165	6,666,696	143	8,492,489
Illinois	222	6,369,296	189	6,627,369
Ohio	527	5,687,729	461	5,667,605
Missouri	388	5,633,384	355	5,354,186
Texas	84	3,335,231	80	4,085,185
Indiana	411	4,770,061	338	4,494,402
Pennsylvania	585	3,610,339	534	3,857,993
Michigan	293	3,393,296	238	3,010,667
Washington	60	2,797,792	57	3,760,873
Tennessee	274	2,965,687	290	3,037,904
Kentucky	303	2,808,618	286	2,696,843
Wisconsin	149	3,468,815	96	3,030,863
Nebraska	189	2,264,861	168	2,375,810
Virginia	245	1,842,774	299	2,099,328
California	54	1,800,349	49	1,778,345
North Dakota	58	1,823,146	52	2,163,938
Oklahoma	77	2,199,995	56	2,068,536
Oregon	95	1,357,393	63	1,783,023
Iowa	122	1,505,009	92	1,473,196
North Carolina	157	729,624	191	931,982
Maryland	156	1,091,390	127	1,073,760
Colorado	39	975,067	42	1,226,731
South Dakota	76	965,970	63	919,443
Montana	12	375,440	26	870,065
West Virginia	101	608,953	92	485,699
Idaho	44	385,037	42	568,711
Utah	56	458,498	61	500,722
Georgia	27	410,120	17	340,075
Arkansas	38	231,444	41	283,878
New Jersey	58	261,421	36	158,504
All other States	99	650,981	88	578,233
Total	5,621	105,094,806	5,055	115,686,750

[1] Census of Manufactures, 1914, Flour-mill and Gristmill Products, p. 15.

This table shows the relative importance of commercial milling in the different States, and affords interesting evidence of the country-wide extent of the decrease in number of mills. The only notable exceptions to this rule are two small groups of States—Virginia, North Carolina, and Tennessee in the South and Colorado, Montana, and Utah in the Rocky Mountain region.

LOCALIZATION OF COMMERCIAL MILLING.—During the first 100 years of its history practically every neighborhood in the United States had its own mill grinding one or more different kinds of grains. For the past 40 years or more, however, the production of wheat

MAP I.



flour has been shifting from these small neighborhood mills to the larger commercial mills referred to above. Furthermore, these new large mills have been located in centers and areas offering peculiar advantages in regard to wheat supply and transportation facilities, together with satisfactory sources of power.

As a consequence of this development of wheat-flour milling within the areas which produce good milling wheat in adequate quantities, it is easy to set off a wheat-flour zone, as shown in Map I above. Every State included in this wheat-flour zone has at some

time produced more than a million barrels of flour in a single year. No State included in the small production areas has ever, so far as known, produced a million barrels in a single year, nor in recent years much in excess of half a million barrels.

The States are listed below in order of output, together with the barrels of flour produced by each in the year ending June 27, 1919, according to the reports of the Grain Corporation:

States in wheat-flour zone.

	Barrels.
Minnesota	28,273,000
Kansas	12,668,000
New York	8,690,000
Missouri	8,021,000
Illinois	6,339,000
Ohio	5,544,000
Washington	4,817,000
Texas	3,628,000
Indiana	3,583,000
California	3,137,000
Oklahoma	3,106,000
Oregon	2,918,000
Nebraska	2,914,000
Pennsylvania	2,630,000
Tennessee	2,555,000
Kentucky	2,491,000
Michigan	2,274,000
North Dakota	2,236,000
Virginia	2,082,000
Montana	1,934,000
Wisconsin	1,709,000
Iowa	1,522,000
Colorado	1,481,000
North Carolina	1,268,000
Idaho	1,024,000
Maryland	[1] 999,000
South Dakota	670,000

States in small-production areas.

	Barrels.
Utah	566,000
Georgia	502,000
West Virginia	475,000
Arkansas	314,000
Wyoming	116,000
South Carolina	104,000
Delaware	89,000
Arizona	86,000
New Jersey	83,000
New Mexico	81,000
Nevada	78,000
New Hampshire	78,000
Alabama	38,000
Massachusetts	[2] 14,000
Maine	[2] 9,000
Vermont	[2] 3,000
Louisiana, Mississippi, Florida	7,000
Connecticut	[3]
Rhode Island	[3]

[1] Includes flour produced in the District of Columbia.
[2] Production in 1914 according to the census.
[3] No information available.

The total production shown above for the Wheat Flour Zone was about 118 million barrels; for the small-production areas, less than 3 million barrels. The per capita production was respectively 1.5 and 0.1 barrels. Assuming that consumption was approximately 1 barrel per capita [11] in the Wheat Flour Zone, its mills made about 50 per cent more flour than it required for its own use. On the same basis the States in the small-production areas supplied only about a tenth of their own needs. Again, accepting the same estimate of consumption, since the estimated population of the Wheat

[11] One barrel per capita is approximately the estimated average consumption for the entire United States shown on p. 14.

Flour Zone was 79 millions in 1919 it must have had a surplus for sale in other States or abroad, approaching 40 million barrels. On this same basis, since the States in the small-production areas had a population of 28 millions, they must have obtained from other States some 25 million barrels of their flour supply. In 1919 the Wheat Flour Zone produced 906,411,000 bushels of wheat, the small-production areas only 34,576,000 bushels.

The relation of different States to commercial milling, indicated by their production and approximate consumption of wheat flour, is the basis for the division of the United States into the areas shown on Map II (facing p. 20).

The small production areas shown on this map do not include exactly the same States as they do in Map I, on page 17, because under the more specific classification used for Map II the States whose consumption is considerably in excess of their production have been transferred to buying areas. In other words, this map includes under the title "Small Production Area" only States whose consumption, as well as their production, is relatively of small importance.

The States of considerable importance in the commercial flour market have been divided into three main groups, and Map II shows the territory occupied by each of these groups, divided into areas determined by location, but also in accordance with other distinctive characteristics of the different areas. The first group, which constitutes the "Selling Areas," includes only those States each of which have an approximate commercial market surplus, or excess of production over consumption [12] amounting to over 1,000,000 barrels.[13] The second group, which constitutes the "Buying Areas," includes only those States each of which have an approximate demand for flour from other States, determined by the same method, amounting to over 1,000,000 barrels. There remains a third group of States located in the Wheat Flour Zone shown on Map I which does not come under either of these classifications, because on the same basis none of them show an annual commercial market surplus or deficit amounting to 1,000,000 barrels. The failure of these States to classify in either the selling or buying group has made it convenient to designate the territory occupied by them as Neutral Areas.

Northwestern Selling Area.—For 30 years the most important group of commercial mills in the United States has been located in the State of Minnesota. In recent years the milling industry has also been growing rapidly in North Dakota and Montana. These

[12] The number of barrels consumed is assumed to be equal to the estimated population of the States.

[13] The only exception to this rule is the State of Idaho, which is included in the Pacific Selling Area because of its production of over 2 barrels per capita and its rapidly increasing output.

three States constitute a large part of the area generally known in the grain and flour trade as the Northwest. The extraordinary development of wheat-flour milling in this area during the last 50 years is due to its large production of hard spring wheat, and the recognition, practically throughout the world, of the excellence of hard spring wheat flour. According to the census of 1870 the value of flour and grist mill products in Minnesota was $7,534,575.[14] There was an eightfold increase in the next 20 years, the wheat flour alone being valued at $54,029,614 in 1889.[15] In that year the State made 13 million barrels of flour—at least 11 million barrels more than the probable consumption by its own people. In 10 years more this surplus had increased to 20 million barrels.

According to the map the Northwestern Selling Area produced 32.4 million barrels of flour in 1918–19, although it had a population of only 3.7 millions. It apparently sells to other States and abroad between 25 and 30 million barrels of flour each year. Its per capita production of 8.8 barrels is not approached by any other area. The map shows that over three-fourths of the wheat harvested in this area in 1918 was hard spring wheat.[16] However, in spite of the very good harvest of that year the quantity of hard spring wheat produced was but little over 150 million bushels. When this is compared with the flour produced in 1918–19, amounting to 32.4 million barrels, some question is at once raised as to a continued satisfactory supply of this wheat for the mills of this area, after providing seed and allowing for waste. The importance of this matter is emphasized by the decrease in the total wheat crop of the area from 206 million bushels in 1918 to 102 million bushels in 1919, in spite of an insignificant increase in the acreage sown.

It should be noted, however, that a considerable part of the 75 million bushels of hard spring wheat produced in the Central Neutral Area is grown in States adjacent to Minnesota and finds its best market in that State.

The table below compares the wheat crop, the flour production, and the population of the Northwestern Selling Area for specified periods between 1899 and 1919 at five-year intervals. The wheat crop is the average of three crops for the periods indicated as estimated by the Department of Agriculture. (See p. 12.) The flour production is the merchant mill output[17] reported by the census,

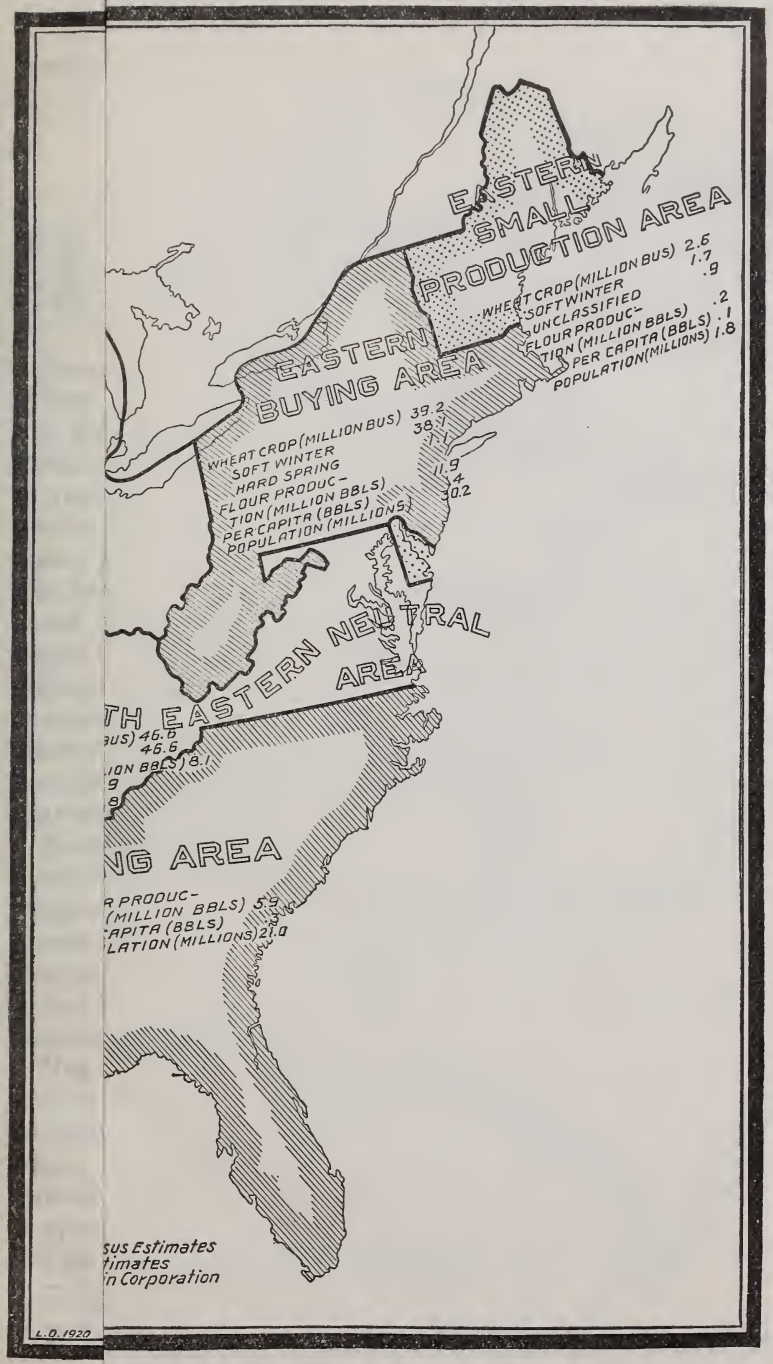
[14] Census 1870, vol. 3, p. 536.

[15] Census Bulletin, Flouring and Grist Mill Products, 1902, p. 13.

[16] See Exhibit II, p. 108, for the percentage table on which the figures for hard spring, hard winter, and other wheats shown on the map are based. The necessarily approximate character of all such expert estimates has already been noted.

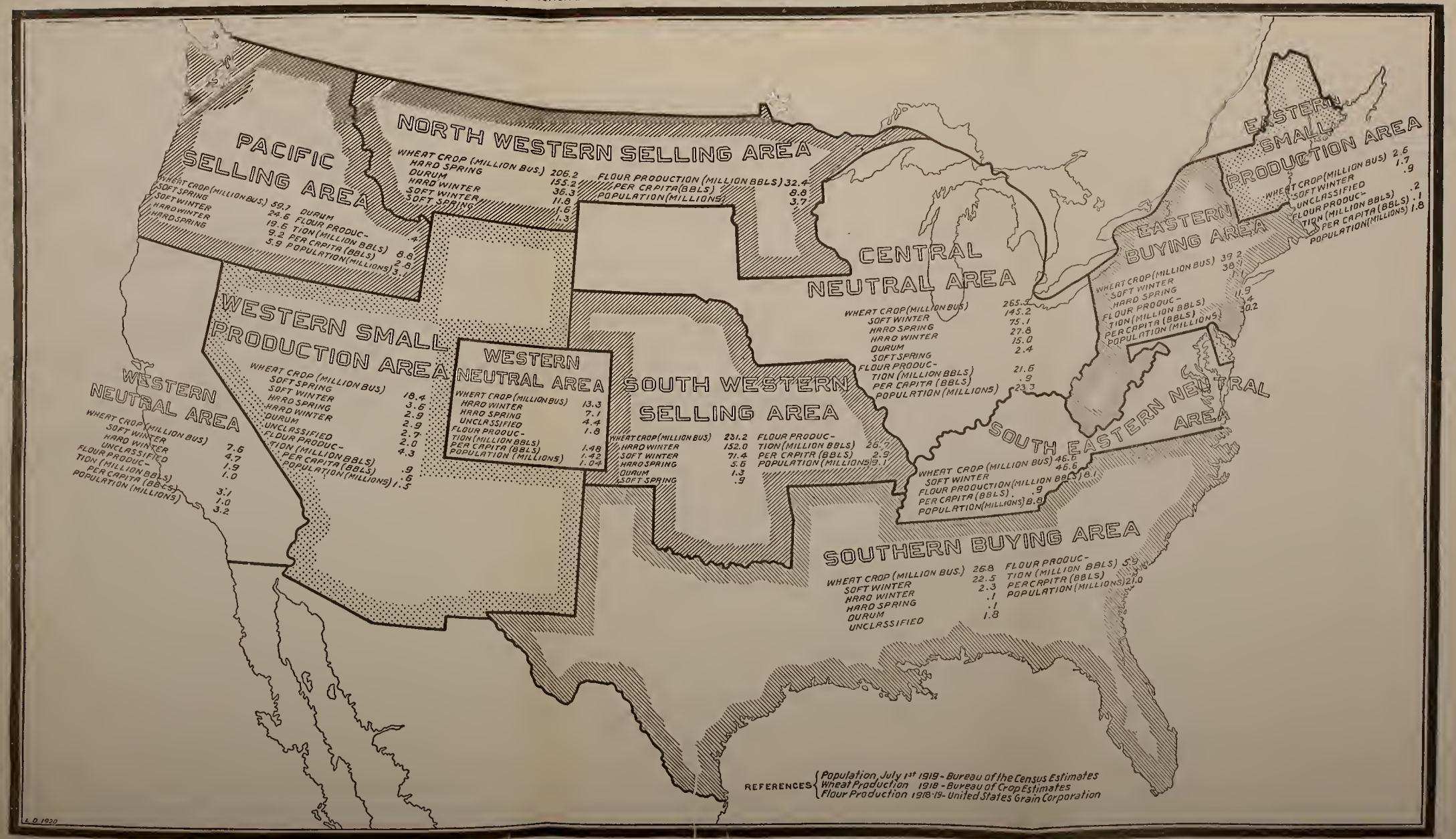
[17] It would have been desirable to have used the production in all mills, but it was not available by States for 1904, 1909, and 1914. Merchant mill output for the entire country, however, constituted 99.38 per cent of total production in 1914. Furthermore, total production has been used for the comparisons between 1899 and 1919, as shown in Table 12.

d deficit. Small Production Areas, states having
her states..



WHEAT FLOUR PRODUCTION AND DISTRIBUTION AREAS

Note. Selling Areas include states having a million barrels estimated surplus flour output; Buying Areas, states having a million barrels estimated deficit. Small Production Areas, states having less than a million barrels of production and also less than a million barrels of consumption; Neutral Areas, all other states.



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except for 1919, which is the production reported by the Grain Corporation. The population is the census estimate for July 1 of the given year.

TABLE 5.—*Wheat crop, flour production, and population in the Northwestern Selling Area, 1899, 1904, 1909, 1914, and 1919.*

Period.	Estimated average annual wheat crop.	Year.	Flour production.	Estimated population.
	Bushels.		*Barrels.*	
1897–1899	127,917,484	1899	23,883,486	2,252,482
1902–1904	132,830,162	1904	25,392,252	2,609,500
1907–1909	149,183,081	1909	24,938,764	2,971,502
1912–1914	180,231,667	1914	30,169,151	3,333,499
1917–1919	144,593,333	1919	32,443,000	3,695,498

Except for the 1909 figures, the table indicates a steady increase in flour production.[18] In 1899 the indicated surplus over consumption was 21½ millions. Owing to the relatively small production in 1909, no appreciable increase in the surplus is indicated for the first 10 years of the period. From 1909 to 1919, on the contrary, there was an increase of 7½ million barrels in output and an indicated increase in surplus amounting to six or seven millions. The wheat crop has not increased so rapidly as flour production, and, as already noted (see p. 20), even in good years hardly enough hard spring wheat is harvested to provide seed and a sufficient supply for the mills to maintain their maximum output. As the table shows, the average crop of the last three harvests, including all the durum and other varieties of wheat, would have been barely sufficient for the flour production in 1918–19, even if there had been no waste and no provision for seed.

Southwestern Selling Area.[19]—Kansas and the three adjacent States—Nebraska, Oklahoma, and Missouri—constitute the Southwestern Selling Area. This is unquestionably the area that now promises most in the way of increased flour production. This, however, depends in part on the assumption that its people will be willing to use their own soft wheat flour to some extent in order to sell the more marketable hard wheat flour.

Map II shows that in 1918 this Southwestern area produced 231 million bushels of wheat, of which 152 millions was the hard winter wheat from which a flour is made that is not far behind the hard spring wheat flour in its bread-making qualities. The difference in the quantities of hard wheat produced in the two principal selling areas is apparently negligible. As already noted, the Southwestern area has an advantage over the Northwestern in a greater supply of soft

[18] Per capita flour production in the Northwestern Selling Area was as follows: 1899, 10.6 barrels; 1904, 9.7 barrels; 1909, 8.4 barrels; 1914, 9.1 barrels; 1919, 8.8 barrels.

[19] The territory tributary to Kansas City is known in the grain and flour trade as the Southwest.

wheat which it can use itself if necessary, but also a disadvantage from the point of view of commercial milling, in that it has nearly two and one-half times as large a population to supply with flour. Consequently, although it makes over three-fourths as much flour, 26.7 million barrels, as compared with 32.4 millions, its surplus for shipments to other States may not be much, if any, over half that sent out by the Northwestern area.

The table below furnishes the same data for the Southwestern Selling Area that are shown for the Northwestern on page 21.

TABLE 6.—*Wheat crop, flour production, and population in the Southwestern Selling Area, 1899, 1904, 1909, 1914, and 1919.*

Period.	Estimated average annual wheat crop.	Year.	Flour production.	Estimated population.
	Bushels.		*Barrels.*	
1897–1899	111,649,604	1899	12,884,074	6,341,703
1902–1904	163,536,221	1904	17,511,271	7,012,668
1907–1909	159,977,874	1909	21,032,602	7,721,432
1912–1914	244,735,333	1914	22,635,310	8,430,190
1917–1919	225,744,000	1919	26,709,000	9,138,950

In general the table shows that the supply of wheat has more than doubled in the last 20 years and the production of flour [20] has kept pace with it, while population has increased less than 50 per cent. Consequently its indicated surplus for shipment to other sections of the country increased from about 6.5 million to about 17.6 million barrels. Apparently the wheat fields of this area will be able to supply its mills abundantly, even if its surplus flour for outside markets is pushed up to or even beyond the present shipments of the Northwestern Selling Area. It is to be remembered, however, that the mills of the Northwest are already drawing large quantities of wheat from this area, and that the rapidly increasing flour output of Texas is in part due to the ready availability of hard winter wheat.

Pacific Selling Area.—A third area of increasing commercial importance includes Washington, Oregon, and Idaho in the Pacific Northwest. The large surplus of wheat in this area and its great distance from important flour markets results in a lower cost of wheat to its millers than to those of any other important producing section. Consequently, although it produces many varieties of wheat, most of which are decidedly inferior to the hard wheats of the plains States for the production of bread-making flours, the area is always able to find a market for its increasing flour surplus either in California, in the Orient, in South America, or in the southeastern part of the United States.

The map shows that this area produced 15 million bushels of hard wheat in 1918. This was more than enough to supply its own popu-

[20] Per capita flour production in the Southwestern Selling Area was as follows: 1899, 2 barrels; 1904, 2.5 barrels; 1909, 2.7 barrels; 1914, 2.7 barrels; 1919, 2.9 barrels.

lation with hard-wheat flour. Apparently, however, flour from this wheat does not have the same bread-making qualities as hard-wheat flour made farther east, since that flour is sold in the Pacific Northwest at a premium over the home product. The wheat production shown on the map, which is the crop of 1918, was considerably below the average production for some years past. As a matter of fact, the available surplus wheat is sufficient so that there need be no immediate concern on the part of the millers on that score.

The table below furnishes the same data for the Pacific Flour Selling Area that are shown for the Northwestern on page 21.

TABLE 7.—*Wheat crop, flour production, and population in the Pacific Selling Area, 1899, 1904, 1909, 1914, and 1919.*

Period.	Estimated average annual wheat crop.	Year.	Flour production.	Estimated population.
	Bushels.		*Barrels.*	
1897–1899	44,793,967	1899	3,868,793	1,063,168
1902–1904	45,261,092	1904	5,074,612	1,526,321
1907–1909	58,590,250	1909	4,550,545	2,056,416
1912–1914	81,743,000	1914	6,128,369	2,586,511
1917–1919	65,366,000	1919	8,759,000	3,116,606

It appears from the above table that there is slight probability of the Pacific Flour Selling Area becoming as important in the commercial flour market as either of the other flour-selling areas. Its wheat production at the beginning of the period covered by the table was considerably less than half that produced in either of the other areas and the increase during the 20 years was by no means so rapid as it was in the Southwestern. Nevertheless, its flour production increased from 3.9 million barrels in 1899 to 8.8 million barrels in 1919, or at a more rapid rate than the increase in either of the other areas.[21] Population, however, was increasing still more rapidly. In 1899 it was less than one-half that of the Northwestern area and but one-sixth that of the Southwestern. But in 1919 it was five-sixths that of the Northwestern and over a third that of the Southwestern. Measuring consumption by population, the indicated increase in the Pacific area during the last 20 years was over 2 million barrels, in the Northwestern less than 1 million and a half, and in the Southwestern less than 3 millions.

In spite of this rapid increase in the population of the Pacific Selling Area, its indicated surplus of flour for shipment to outside territory shows increases in each of the years covered except 1909. On the generous assumption that the consumption of flour in the area is 1⅓ barrels per capita, the surplus for export in 1899 was about 2 million barrels and increased to nearly 5 millions in 1919; that is, in spite of the rapid increase in population and the less

[21] Per capita flour production in the Pacific Flour Selling Area was as follows: 1899, 3.6 barrels; 1904, 3.3 barrels; 1909, 2.2 barrels; 1914, 2.4 barrels; 1919, 2.8 barrels.

favorable progress of the wheat supply as compared with the Southwest, the surplus flour available for shipment outside its territory probably increased at a faster rate in this area than in either of the others.

Eastern Buying Area.—The above description of flour-selling areas shows that 10 States located in a general way in the northwestern part of the country usually produce surplus flour to the amount of 40 to 50 million barrels annually. On the other hand, seven States located east of the Alleghenies and north of Virginia and nine States in the South, beginning with North Carolina and ending with Texas, together afford a market for from 30 to 35 million barrels of flour sent in from other States.

The Eastern Buying Area, which includes Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and West Virginia, has a population of 30.2 million people and a flour production of only 11.9 million barrels, or 0.4 of a barrel per capita. On the assumption that flour consumption in this territory is practically the same per capita as the average for the United States in recent years, it must afford a market for outside flour to the amount of 18 to 20 million barrels annually. This area produced only about 40 million bushels of wheat in 1918—much less than was used in its own mills. Ninety-five per cent of the crop was soft winter wheat.

Most of the mills in this area are comparatively small and are so situated that it would be impossible for them to maintain the standard qualities in their product which is required in flour that sells readily in commercial markets.

A marked exception to this general rule is the group of large mills located at Buffalo, N. Y. The advantage of lake transportation for hard wheat from the West and electric power from Niagara Falls enables them to compete successfully with the western mills. The consequent increase of the flour output of mills in Buffalo and its vicinity from about 2 millions in 1904 to an average of over 6 millions in recent years,[22] has raised the per capita production of flour in this area far beyond what it otherwise would have been.

The table below furnishes the same data for the Eastern Buying Area that are shown for the Northwestern on page 21.

TABLE 8.—*Wheat crop, flour production, and population in the Eastern Buying Area, 1899, 1904, 1909, 1914, and 1919.*

Period.	Estimated average annual wheat crop.	Year.	Flour production.	Estimated population.
	Bushels.		*Barrels.*	
1897–1899	41,199,091	1899	10,604,845	20,211,494
1902–1904	36,770,764	1904	10,639,021	22,625,378
1907–1909	39,934,436	1909	11,369,357	25,159,550
1912–1914	34,151,333	1914	13,199,741	27,693,726
1917–1919	42,066,000	1919	11,892,420	30,227,896

[22] The Millers Almanac, 1918–19, p. 149.

The foregoing table shows a situation strikingly different from that which exists in the selling areas. The first four periods show decreases in the wheat supply, but under the stimulus of war demand the last period shows a crop slightly in excess of that raised 20 years before. In marked contrast the population has increased from 20 millions at the beginning of the period to 30 millions at the end. That is, there has been an increase of 50 per cent in the demand for flour with practically no increase in the supply of wheat. Flour production shows some increase; more, indeed, than the increase in the wheat crop.[23] The reason for this, as shown above, is the rapid growth of wheat-flour production in Buffalo and vicinity. Although the table shows a decrease in the output of flour from a little over 13 million barrels in 1914 to something less than 12 millions in 1919, it would not be safe to argue from this that a tendency to declining output has been established. The probability is that this decrease is in considerable part due to Government activities affecting the production of flour during the war and since then.

Southern Buying Area.—This area includes the States of North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, and Texas. The dependence of a considerable part of this territory on outside sources for its wheat-flour supply is not fully brought out by the map because of the recent development of hard winter wheat milling in Texas and a still more notable increase in both the wheat crop and the flour production of North Carolina, which together increase the figures shown for the entire area very considerably. Indeed, while only about one-third of the population of the area resides in these two States, they produce over 80 per cent both of its flour output and of its wheat crop.

In spite of the rapid increase in flour production in Texas and North Carolina, which, if continued, will in no long time render them independent of the surplus flour producing States, they each buy over a million barrels of flour annually from other States at the present time and have, for that reason, been grouped with other States in the Southern Buying Area.

The map shows that this area has a population of 21 millions, and that in 1918–19 it produced only 6 million barrels of flour. Even this small production could hardly have been made from its wheat crop in 1918 after providing for seed and ordinary waste in storage and transportation. The wheat that is produced is in large part soft winter wheat, although Texas is developing the production of hard winter wheat on its high northern plains. Even including Texas and North Carolina the area probably produces but little, if any, more than a third of the flour it consumes.

[23] Per capita flour production in the Eastern Buying Area was as follows: 1899, 0.52 barrels; 1904, 0.47 barrels; 1909, 0.45 barrels; 1914, 0.48 barrels; 1919, 0.39 barrels.

It is hardly necessary in this report to enter into a discussion of the natural advantages of this area in the production of cotton and other semitropical products, or to point to its relative disadvantages in the production of wheat, or of flour that would satisfy the requirements of its large central markets.

The table below furnishes the same data for the Southern Buying Area that are shown in the table on page 21 for the Northwestern:

TABLE 9.—*Wheat crop, flour production, and population in the Southern Buying Area, 1899, 1904, 1909, 1914, and 1919.*

Period.	Estimated average annual wheat crop.	Year.	Flour production.	Estimated population.
	Bushels.		*Barrels.*	
1897–1899	19,832,018	1899	4,498,368	14,842,579
1902–1904	24,336,826	1904	5,109,952	16,360,041
1907–1909	15,853,057	1909	4,821,702	17,901,884
1912–1914	23,606,000	1914	5,719,892	19,443,734
1917–1919	35,852,333	1919	5,861,000	20,985,584

This area has increased its wheat crop in the last 20 years more rapidly than any other area shown on the map, except the Southwestern Selling Area and the Western Small Production Area. But Texas produced 31 million bushels of wheat in 1919 in contrast with an average production for the whole area in 1907, 1908, 1909 of only 16 million bushels. Nevertheless, detail figures for all the States except South Carolina, Florida, and Louisiana show large increases in the last 10 years. The very great increase in the last period was undoubtedly in large part due to the war. It appears probable, however, that the Cotton States are really making progress in the diversification of their farm products.

In spite of the remarkable increase in the flour output of North Carolina and Texas, flour production for the entire area increased only about 1½ million barrels,[24] while population increased 6 millions.[25]

Central Neutral Area.—As already noted, large production States which apparently have annual wheat-flour surpluses or deficits of less than 1,000,000 barrels have been grouped in areas designated as "Neutral." They occupy territory which has been divided into the Central, Southeastern, and Western Neutral Areas. Possibly the low-flour output, hard-wheat producing States—South Dakota, Iowa, and Wisconsin—could have been set off in a separate group

[24] This is the only area in which the use of merchant mill output instead of total production materially affects these comparisons. If total production in the Southern Buying Area is used for 1899, this increase shrinks to 600,000 barrels.

[25] Per capita production of flour in the Southern Buying Area was as follows: 1899, 0.30 barrels; 1904, 0.31 barrels; 1909, 0.27 barrels; 1914, 0.29 barrels; 1919, 0.28 barrels.

to advantage, but they have been included with Illinois, Michigan, Indiana, and Ohio in the Central Neutral Area.

This area produces more wheat than either of the great flour-selling areas, yet according to the data on the map its mills apparently fail to manufacture enough flour for its own population, the flour production being shown as only 21.6 million barrels, while the population numbers 23.3 millions. This gives a per capita production of only 0.9 barrels—somewhat less than the average per capita consumption of the entire country. Two reasons for this situation appear quite clear. Most mills in this area are much smaller than those in the selling areas, and their limited output, together with transportation difficulties, make it impossible for them to produce the constantly maintained and standardized quality of flour required in a commercial market. They are also at a disadvantage in that, although they have an abundant supply of soft wheat readily available, it is possible to sell only a limited quantity of soft wheat flour in competition with the hard wheat flours produced farther west, and such sales must be made at a considerable discount below hard wheat flour prices.

It should be noted further that some of the hard wheats produced in the northwestern section of this area are undoubtedly shipped into and ground in the hard wheat flour selling areas. The table below shows the same data for the Central Neutral Area as are shown for the Northwestern on page 21.

TABLE 10.—*Wheat crop, flour production, and population in the Central Neutral Area, 1899, 1904, 1909, 1914, and 1919.*

Period.	Estimated average annual wheat crop.	Year.	Flour production.	Estimated population.
	Bushels.		*Barrels.*	
1897–1899	186,497,083	1899	30,639,443	18,355,022
1902–1904	150,988,598	1904	27,276,069	19,628,065
1907–1909	170,175,070	1909	26,344,245	20,863,648
1912–1914	160,772,667	1914	25,401,222	22,102,246
1917–1919	230,790,333	1919	21,641,000	23,341,415

The decrease of 9 million barrels in the flour production of this area in a 20-year period,[26] during which its population increased 5 millions, is one of the most interesting contrasts that has developed in the industry. Because of these changes its indicated surplus for shipment into other areas, or abroad, which amounted to 12.3 million barrels in 1899, was replaced by an indicated deficit in its own flour markets amounting to 1.7 million barrels. As a matter of fact,

[26] Per capita flour production in the Central Neutral Area was as follows: 1899, 1.7 barrels; 1904, 1.4 barrels; 1909, 1.3 barrels; 1914, 1.1 barrels; 1919, 0.9 barrel.

it has retained a considerable part of its trade in outside territory, and its own population consumes a corresponding amount of hard-wheat flours shipped in from the West. In a general way wheat and flour output went down together during the first 15 years. It is quite impossible to tell whether or not this tendency would have been continued had it not been for higher wheat prices and Government regulation of flour milling in recent years. It certainly may be questioned, however, whether the revival of soft-wheat production in this area will result in a corresponding increase in its output of flour. On the other hand, it is altogether improbable that the upward trend of the crop and the downward trend of the flour output shown from 1914 to 1919 can continue for any length of time.

Southeastern Neutral Area.—The States of Kentucky, Tennessee, Maryland, and Virginia have had a sufficiently different experience from the neutral area farther west to warrant setting them off as the "Southeastern Neutral Area." The crop in this area is composed entirely of soft winter wheat. This is produced apparently in nearly sufficient quantity to supply its mills and seed its fields. The mills in turn appear to produce nearly—possibly quite—enough flour to supply the population, since these States are supposed to use corn meal in considerable quantity.

The table below furnishes the same data for the Southeastern Neutral Area that are shown for the Northwestern on page 21.

TABLE 11.—*Wheat crop, flour production, and population in the Southeastern Neutral Area, 1899, 1904, 1909, 1914, and 1919.*

Period.	Estimated average annual wheat crop.	Year.	Flour production.	Estimated population.
	Bushels.		*Barrels.*	
1897–1899	46,214,835	1899	8,811,547	7,403,135
1902–1904	31,700,370	1904	8,658,002	7,767,431
1907–1909	36,792,082	1909	8,892,454	8,108,689
1912–1914	38,884,333	1914	9,089,015	8,449,947
1917–1919	43,247,333	1919	8,127,000	8,791,207

This area appears to be in every respect more stationary than the others so far reviewed. Its population shows considerably less than one-half the rate of increase in the country as a whole, and the figures establish no trend in regard to flour production.[27] This means, of course, a slight decline in per capita output. On the whole, in spite of the larger crop shown for the last period, the indication is that the wheat crop is declining and probably does not fully supply

[27] Per capita flour production in the Southeastern Neutral Area was as follows: 1899, 1.2 barrels; 1904, 1.1 barrels; 1909, 1.1 barrels; 1914, 1.1 barrels; 1919, 0.9 barrel.

the mills in the area. The surplus soft wheat of the Central Area is, however, readily available.

Western Neutral Areas.—California and Colorado in the West each produce more than a million barrels of flour and under the rule followed can not be classified either in the buying or selling areas. Since California is apparently losing rank as a wheat and flour producer, while Colorado is making rapid progress, nothing would be gained by combining data for the two States.

During the 20 years under review progress of population was similar—a little less than 100 per cent for Colorado but something over 100 per cent for California. On the other hand, from 1899 to 1914 Colorado's wheat production (three-year average) increased from 5.8 to 10.7 million bushels, while that of California fell off from 27 million bushels to 5.8 millions. During the war California's crop increased again to 10.5 million bushels and Colorado's crop went on up to 14.8 millions. California's flour output showed a consistent decline from 2.7 million barrels in 1899 to 1.8 millions in 1914, but in 1919 it amounted to 3.1 millions. Colorado's flour output did not respond to the increasing supply of wheat in the first ten years, but in the second it increased from a million to a million and a half barrels.

Small Production Areas.—There are nine States—Wyoming, Utah, New Mexico, Arizona, and Nevada in the West, and Maine, New Hampshire, Vermont, and Delaware in the East—whose combined output of flour is but little more than a million barrels a year. In fact, up to 1909 it was less than a million. Their wheat crop is almost as insignificant. It is worthy of note, however, that it nearly doubled during the 20 years, amounting to 2.4 million bushels in the Eastern States in 1919 and 16.2 millions in the Western States. The population of the Western States doubled in the 20 years, amounting to 1.5 millions in 1919. The eastern group increased its population from 1.6 to 1.8 millions. It is evident that the entire demand for flour from other States is relatively insignificant. Further information in regard to the small production areas as well as the other areas will be found in Exhibit III.

Wheat crop, flour production, and population of the United States, and of certain areas compared.[28]—Wheat crop, flour production, and population figures for the United States as a whole in 1899 and in 1919 are shown in the following table, together with the percentages

[28] See also Exhibit III. It would have been instructive to have presented figures on acreage sown in this connection, but satisfactory statistics were not obtained. The effects of marked changes in yield per acre have, however, been noted in the text.

of these totals found in the more important areas shown on Map II (see footnotes to table):

TABLE 12.—*Wheat crop, flour production, and population of the United States in 1899 and 1919, together with the different percentages of those totals found in the more important areas shown on Map II.*

	Wheat crop.[1]	Flour production.[2]	Population.[3]
United States:	*Bushels.*	*Barrels.*	
1899	621,277,375	103,524,094	74,798,612
1919	831,580,667	121,156,373	106,877,895
Northwestern Selling Area:			
1899 ..... per cent	20.6	23.2	3.0
1919 ..... do	17.4	26.8	3.5
Southwestern Selling Area:			
1899 ..... do	18.0	12.9	8.5
1919 ..... do	27.1	22.0	8.6
Pacific Selling Area:			
1899 ..... do	7.2	3.8	1.4
1919 ..... do	7.9	7.2	2.9
Eastern Buying Area:			
1899 ..... do	6.6	11.1	27.0
1919 ..... do	5.0	9.8	28.3
Southern Buying Area:			
1899 ..... do	3.2	5.1	19.8
1919 ..... do	4.3	4.8	19.6
Central Neutral Area:			
1899 ..... do	30.0	30.4	24.5
1919 ..... do	27.8	17.9	21.8
Southeastern Neutral Area:			
1899 ..... do	7.5	9.0	9.9
1919 ..... do	5.2	6.7	8.2

[1] Average of crop for 1897–98–99 and 1917–18–19, Department of Agriculture estimates.
[2] Bureau of Census figures for 1899 and United States Grain Corporation figures for 1919.
[3] Bureau of the Census estimate as of July 1.

This table shows, as has already been noted, that from 1899 to 1919 population increased over twice as fast as flour production. Wheat made better progress than flour, but its rate of increase, in spite of the war, was much below that of population. It is not to be assumed from these figures, however, that wheat farming in the United States will continue to develop more rapidly than the wheat-flour industry. The probable explanation of the lag in flour output compared with wheat production is the lack of assurance on the part of the miller that the increase of 34 per cent in 20 years shown by the wheat crop is to be accepted as so much permanent addition to their readily available supplies of satisfactory raw material.

Table 12 shows that during the 20 years it covers, the Northwestern Selling Area added 3.6 per cent to its proportion of total flour output, but that the addition to its proportion of total population was only 0.5 per cent and that there was a decrease of 3.2 per cent in its wheat crop. The increasing importance of this area in the commercial flour markets of other States is made very plain by this comparison. It also indicates a very considerable decline in its relative importance in the production of wheat. This is probably due to the poor yield per acre in 1917, 1918, and 1919, as estimates of acreage sown show a slight increase. Prior to 1900 the flour industry in this area had been developing rapidly because of the ready availability of hard

spring wheat in excess of its own requirements. The excellence of the flour made from this wheat, and the business enterprise of the mills, have brought about the situation shown by Table 12, in which, apparently, the rapid growth of the flour business has carried it beyond those favorable conditions of wheat supply which existed between 1870 and 1900.

The contrast between this situation in the Northwest and that in the Southwest is striking. There the readily available supply of wheat, much of it of an excellence that makes it a strong competitor of hard spring wheat, is still increasing rapidly, and the remarkable expansion of the flour output of the area does not yet seriously threaten the great surplus of the raw material which is responsible for that expansion. The population figures show that there was practically no increase in its relative importance as a market for flour during the 20 years. On the other hand, its proportion of the total flour output and its proportion of the total wheat crop were both increased by 9.1 per cent. The estimated increase in acreage sown was considerably greater, amounting to 14.2 per cent. This means that, although its importance in the flour production of the United States had increased over 70 per cent, the surplus of wheat on which that remarkable progress depended was larger at the end of the period than at its beginning.

Almost as interesting a situation of quite a different character has developed in the Pacific Selling Area. The rate of increase in population in that area has been remarkable, much more rapid than the rate of increase in its flour output. This indicates, of course, that with a continuation of exactly the same conditions this area would in time become a buyer of flour instead of a seller. But its population is so small that, even with the rapid increase, it included only 1.5 per cent more of the country's flour consumers in 1919 than in 1899. On the other hand, its proportion of total flour output had increased 3.4 per cent. This, as already noted on page 23, indicated a considerable increase in its shipments to other States and to foreign countries. The wheat figures make it evident, however, that the importance of the area in outside markets can not be permanent without some change in the indicated tendency of wheat farming.

The degree of dependence of the two buying areas on other States for their flour supplies is clearly indicated by Table 12. Twenty-seven per cent of the entire population of the country was located in the Eastern Buying Area in 1899, and the table shows that the tendency to concentration in that territory still continues. Nevertheless, its mills made only 11.1 per cent of the total flour output at the beginning of the period and their production had fallen to 9.8 per cent at its end. The relative smallness and decreasing importance of its wheat crop is even more striking.

The degree of dependence shown in the Southern Buying Area is greater than that in the East. In 1899 its proportion of the total population was six times as large as its proportion of the total wheat crop, and nearly four times as large as its proportion of the flour output. During the 20 years covered by Table 12 the situation in regard to wheat improved slightly, but flour output was relatively smaller in 1919 than in 1899.

In commenting on the Central Neutral Area, it is important to note that the war appears to have stimulated wheat production more in this area than in any other. Its crop had fallen from 30 per cent of the total in 1899 to 20.2 per cent in 1914,[29] but increased from that figure to 27.8 per cent in 1919. As was to have been expected from the greater ease of expanding agricultural than manufacturing operations, flour output did not show the same response to increased demand. On the contrary, it continued on the down-grade characteristic of both products from 1899 to 1914. Furthermore, the fact that flour made from the wheat produced in this area can be sold only at a much lower price than hard wheat flours undoubtedly discouraged any considerable increase in its production. It appears probable, therefore, that the flour figures for 1919 are much more reliable as an index to the future situation in this area than the wheat figures.

Table 12 only emphasizes the well-known fact that the great agricultural States of the upper Mississippi Valley have not been increasing in population as fast as other sections of the country for many years, by showing a decrease in the Central Neutral Area's proportion of the total population from 24.5 to 21.8 per cent. But the fact that this area is probably buying more flour than it sells in outside territory is surprising. In 1899 its relative importance as a flour consumer was 24.5 per cent, considerably less than its proportion of the total flour output, which was 30.4 per cent. The latter figure affords a striking contrast to 23.2 per cent for the Northwest and only 12.9 per cent for the Southwest. In 20 years, however, its proportion of flour output decreased 12.5 per cent, while that of the other two together increased 12.7 per cent. These figures present clearly, and probably with as much exactness as possible, the steady advance of the change from soft to hard wheat flour which, only fairly started in 1880, made very rapid progress in the next 20 years.

The Southeastern Neutral Area has never been of special importance in the commercial flour market, and that it should have been considerably less important in 1919 than 20 years before is a matter of no surprise.

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[29] See Exhibit III.

CONCENTRATION IN THE MILLING INDUSTRY.—The increase of flour milling in the wheat-growing States, just discussed, has been accompanied by a concentration of the industry in certain favorably located cities, the growth of several powerful milling concerns, and an increase in the number of large mills.

Minneapolis, in the Northwest, Buffalo, on the water route to world markets, and Kansas City, in the Southwest, are the most important wheat-flour milling centers of the United States. Statistics of the trade [30] indicate that half the net increase in flour output from 1899 to 1914 was probably made in these three cities alone.

In spite of the increasing concentration in the ownership of the large mills referred to above, flour milling may still be classed among industries in which a large part of the output is produced by relatively small concerns each operating a single plant. Nevertheless, the proportion of the total business done by a limited number of large companies is very considerable. This condition is most in evidence in years when failure of local wheat supply stops many of the small mills. It is probable that in such years over half the flour consumed in the United States is made by 100 concerns, 65 per cent by 200, and 80 per cent by 400.

In 1914 the total output of the 218 largest mills (more than one owned by a single company in several instances) was over 60 per cent of the total output of the country. The average output of these establishments was 329,000 barrels each. The average output of all other mills was less than 10,000 barrels each.

The 218 mills just referred to each made 100,000 barrels or over in 1914. A classification of mills by barrels of wheat flour produced was first made by the Bureau of the Census for 1899. Custom mills were included in the classification in that year but have been excluded since. These mills, however, are all quite small. The classification for 1899 has, for that reason, been accepted as including none but merchant mills in the classes making 5,000 barrels or more. On this basis the figures show an increase in merchant mills making 100,000 barrels or more from 135 in 1899 to 218 in 1914. In 1899, 2,584 mills were grinding from 5,000 to 20,000 barrels each. In 1914 there were only 1,377 mills in that class.

The figures given above show that, under conditions prevailing in the flour business for 20 years past, mills of large size are rapidly driving out their smaller competitors. In its bulletin on flour-mill and gristmill products in 1914 the Bureau of the Census classifies merchant mills in 32 States according to output in 1904, 1909, and 1914. That classification has been used in the following table

[30] The Miller's Almanack, published by the Northwestern Miller, 1918-19.

to show so far as possible the class of commercial mills (those making a thousand barrels or over annually) operating in the different areas outlined on Map II.

TABLE 13.—*Classification of commercial flour mills according to output and location, 1904, 1909, and 1914.*

	Census year.	All classes.		1,000 but less than 5,000 barrels.		5,000 but less than 20,000 barrels.		20,000 but less than 100,000 barrels.		100,000 barrels or more.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
United States	1904	6,413	100.0	3,502	54.6	2,123	33.10	622	9.69	166	2.58
	1909	5,621	100.0	3,145	56.0	1,733	30.83	550	9.78	193	3.43
	1914	5,055	100.0	2,920	57.8	1,377	27.24	540	10.68	218	4.31
Northwestern Selling Area	1904	384	6.0	126	1.9	160	2.49	61	.95	37	.58
	1909	318	5.6	109	1.9	118	2.10	52	.93	39	.69
	1914	289	5.7	106	2.1	91	1.80	49	.97	43	.85
Southwestern Selling Area	1904	969	15.1	444	6.9	328	5.11	164	2.56	33	.51
	1909	863	15.4	371	6.6	279	4.96	158	2.81	55	.98
	1914	751	14.9	331	6.6	214	4.23	138	2.73	68	1.35
Pacific Selling Area	1904	176	2.7	58	.9	74	1.15	36	.56	8	.12
	1909	199	3.5	79	1.4	75	1.33	36	.64	9	.16
	1914	162	3.2	61	1.2	50	.99	40	.79	11	.22
Eastern Buying Area	1904	[1] 1,001	15.6	681	10.6	246	3.84	54	.84	20	.31
	1909	[1] 909	16.2	623	11.1	232	4.13	40	.71	14	.25
	1914	[1] 805	15.9	559	11.1	180	3.56	49	.97	17	.34
Southern Buying Area	1904	[2] 407	6.4	245	3.8	111	1.73	42	.65	9	.14
	1909	[2] 306	5.4	188	3.3	78	1.39	30	.53	10	.18
	1914	[2] 329	6.5	198	3.9	77	1.52	42	.83	12	.24
Central Neutral Area	1904	2,142	33.4	1,117	17.4	798	12.44	184	2.87	43	.67
	1909	1,800	32.0	978	17.4	610	10.85	165	2.94	47	.84
	1914	1,477	29.2	844	16.7	445	8.80	143	2.83	45	.89
Southeastern Neutral Area	1904	1,041	16.2	678	10.6	310	4.83	42	.65	11	.17
	1909	978	17.4	664	11.8	261	4.64	40	.71	13	.23
	1914	1,002	19.8	696	13.8	248	4.91	45	.89	13	.24
Other States	1904	[3] 293	4.5	153	2.3	96	1.50	39	.60	5	.08
	1909	[3] 2 8	4.5	133	2.3	80	1.43	29	.52	6	.11
	1914	[3] 240	4.8	125	2.5	72	1.42	34	.68	9	.18

[1] These figures do not include mills in the States of Massachusetts and Connecticut.
[2] These figures do not include mills in the States of South Carolina, Mississippi, and Louisiana. (See p. 25.)
[3] These figures include mills in Massachusetts, Connecticut, South Carolina, Mississippi, and Louisiana.

The table shows that the total number of commercial mills in the country fell from 6,413 in 1904 to 5,621 in 1909, and to 5,055 in 1914. This, in connection with the increase in total output, involved an increase in average production per mill from about 16,000 [31] barrels in 1904, to 18,697 in 1909, and 22,886 in 1914; an increase of 17 per cent from 1904 to 1909, and 22 per cent from 1909 to 1914.

The increase in average production per mill from 1904 to 1914 is apparently due to the greater efficiency of the very large mills. The table shows that those producing 100,000 barrels or more increased in number from 166 in 1904 to 218 in 1914; that is, there is an increase during these 10 years of practically one mill for each three mills in that class in 1904. In that year there were only 26 of these mills in each thousand commercial mills in the entire country; in 1914

[31] The number of barrels given for 1904 is approximate. Since the census does not give a separate statement of output for mills making 1,000 barrels and over for that year, it has been estimated by assuming that mills making less than 1,000 barrels had the same output per mill in 1904 as in 1909, and by deducting their output thus obtained from the output of merchant mills of all classes.

their number had increased to 43 in each thousand. Their relative importance had increased nearly 70 per cent.

During the same 10 years, mills having an output of 20,000 to 100,000 barrels decreased in number from 622 to 540. These figures leave a question as to the line between the more efficient and less efficient mills. Although there was a decrease of 82 mills in this class during the 10 years, it is not clear but the increase in the number of 100,000-barrel mills may have been in considerable part made up by very efficient mills in the next lower class increasing their output during the 10 years up to 100,000 barrels. As already noted, the entire number of these mills decreased from 622 to 540, but the number per thousand commercial mills in the country increased from 97 in 1904 to 107 in 1914; that is, their relative importance was increasing.

The table apparently makes it clear that conditions were decidedly unfavorable to the class of mills making from 5,000 to 20,000 barrels of flour annually. Their number decreased from 2,123 in 1904 to 1,377 in 1914. In other words, there were less than two of these mills in the latter year where there had been three in the former. In 1904, of each thousand commercial mills, 331 were in this class; in 1914, only 272.

Conditions appear to have been more favorable to mills making from 1,000 to 5,000 barrels annually. The table shows that their number decreased from 3,502 to 2,920, but that their number per thousand commercial mills increased from 546 to 578.

Table 13 shows that mills of the largest size did not increase in number nearly so fast in the Northwestern Selling Area as in the Southwest. This was to be expected, not only because the rate of increase in flour output in the latter area from 1904 to 1914 was higher than in the former, but also because in 1904 this class of mills already constituted nearly 10 per cent of the commercial mills in the Northwest, while in the Southwest they were still less than 4 per cent of the total. Nevertheless, the percentage figures for the Northwest show an increase of about 50 per cent in the relative importance of this class of mills, while there was practically no change for the next lower class and a decline of approximately 25 per cent for mills making from 5,000 to 20,000 barrels. The smallest mills classed as commercial in this report, those making from 1,000 to 5,000 barrels, fared as well or better here than in the entire country, apparently increasing in relative importance about 10 per cent.

The highest increase in relative importance shown for any group of mills by Table 13 is that of the 100,000-barrel class located in the Southwest. The increase in their percentage figure from 0.51 to 1.35 indicates a growth relative to the entire output of the country of considerably over 150 per cent. It is possible, furthermore, that the

20,000 to 100,000 barrel mills in the area would also be shown to have been decidedly prosperous if account could be taken of mills that passed from this class to the 100,000-barrel class during the 10 years. In this area, contrary to the general rule, the smallest mills, as well as those next larger, decreased in relative importance.

In the Pacific Selling Area the 100,000-barrel mills increased in number from 8 to 11, their relative importance in 1904 and 1914 being expressed by 0.12 and 0.22. While this area did not show so rapid an increase in the largest mills as the Southwest, it did show an increase in the next lower class from 36 to 40 mills. An increase in the number of mills in this class is found nowhere else except in the Southeastern Neutral Area. The change in mills of the 5,000 to 20,000 barrel class was similar to those in the two other selling areas. But in the smallest size mills there recurs the peculiarity, again shared by the same group in the Southeastern Neutral Area, of an increase in numbers, accompanied, of course, by a very considerable increase in relative importance. It appears probable that, as the above situation suggests, the competition of the great commercial mills has had less influence in these areas than in other parts of the country.

The data prepared by the Census Bureau on the classification of merchant flour mills according to output include Massachusetts, Rhode Island, and Connecticut in "Other States." It has, therefore, been necessary in this table to present data for the Eastern Buying Area exclusive of these States. In this area, which produces less than one-half the flour it consumes, the table shows a condition of things quite different from that which prevailed in the selling areas. For example, it shows that the 100,000-barrel class decreased in number from 20 to 17 mills, their relative importance to all mills in the four classes showing no appreciable change. The 20,000 to 100,000 barrel mills held their own very well, the decrease being only from 54 to 49 mills. Nor is the change in the other two classes of any considerable importance. In other words, as might be expected from the fact that there has been no considerable change in the flour output of the area, we find no marked change in the classification of its mills. It should be remembered, however, that the average production of the mills left in this area was considerably more in 1914 than in 1904.

Because the census data include the data for South Carolina, Florida, Alabama, and Louisiana in "Other States," it has been necessary to exclude those States from the Southern Buying Area in this tabulation. The mills in this area, for which the census does give data, show relatively small changes in classification. There were three more mills of the 100,000-barrel class in 1914 than in 1904. This is due to the fact that at certain places it has been possible to develop a satisfactory large milling business, although

in the 20 years the flour output of this entire area, including the States left out in this table, increased only from 5.3 to 5.9 million barrels. The table shows that mills of the 20,000 to 100,000 barrel class maintained their number while there was a decrease in the number of mills in the next lower class from 111 to 77, their relative importance showed no such falling off as is shown in some other areas. Also, contrary to experience in other areas, the smallest mills declined in actual number more than 5,000 to 20,000 barrel mills and showed no increase in relative importance.

The Central Neutral Area has more mills than any other area covered by the table. In 1904 it had a third of all commercial mills, but during the 10 years their number decreased from 2,142 to 1,477, and in 1914 they constituted less than 30 per cent of the greatly decreased total. Even in this area there was a net increase of two mills in the 100,000-barrel class. This increase in the most effective class of mills had but slight effect on the total production of the area, which, as shown on page 27, decreased from 30.6 to 21.6 million barrels. In all other classes the reduction in number was considerable; from 184 to 143 in the 20,000 to 100,000 barrel class, from 798 to 445 in the 5,000 to 20,000 barrel class, and from 1,117 to 844 in the 1,000 to 5,000 barrel class.

The flour-mill industry has never been of considerable importance in the Southeastern Neutral Area, and such mills as are found there belong more generally to the neighborhood class than to the large commercial class. As a consequence, although this area produced less than 9 per cent of the country's total flour output in 1914, its commercial mills amounted to 19.8 per cent of the total. Nevertheless, the apparent necessity for larger mills in order to compete to better advantage with the great western flour manufacturers has increased the number of mills in the 100,000-barrel class from 11 to 13 and in the 20,000 to 100,000 barrel class from 42 to 45, while in the 5,000 to 20,000 barrel class the number decreased from 310 to 248. In this area the 1,000 to 5,000 barrel mills have, as already noted, escaped to some extent the effects of competition from the greater mills of the West. As a consequence their number has increased from 678 to 696 and their relative importance from 10.6 per cent of all mills covered by the table to 13.8 per cent. It is interesting to note that the net increase of 3.2 per cent in the relative importance of all mills in this class is exactly accounted for by the same increase in this one area.

In the remaining States there were only 293 mills in 1904, and in 1914 their number had decreased to 240. Even in this area, where the flour-milling industry is so unimportant, the number of 100,000-barrel mills increased from 5 to 9, while in all other classes there were

decreases ranging from 5 in the next to the largest class to 24 in the 5,000 to 20,000 barrel class.

Concentration and competition.—It is not feasible in this report to do more than refer to some of the other factors besides location of the wheat fields that have entered into the steadily increasing concentration of flour milling described above. The growth of great commercial and industrial centers has compelled the development of the commercial mill—the mill that ships flour into these centers. The commercial mill does not thrive unless it sells a standardized flour, and no mill can produce a standard flour, uniform year after year, unless it is able to draw wheat of the required quality from a distance when necessary.

In spite, however, of the many factors tending to concentration there is no approach toward monopolistic control of the flour industry by any one concern. An attempt to form a great flour trust in 1899 resulted in a complete failure. Later efforts to bring together the great Washburn and Pillsbury interest were unsuccessful. This does not mean, however, that big aggregations of capital are not meeting with success in the flour business. The measure of success is indicated by the published reports of such concerns.

The Washburn-Crosby Co. is a corporation organized in 1889 to take over a milling business that had grown to large proportions in Minneapolis as a private enterprise. The mills now operated by the company have a capacity of about 60,000 barrels per day. Operated to full capacity they could apparently produce a sixth of all the flour consumed in the United States.

The Pillsbury Flour Mills Co. also carries on a business organized and successfully developed through many years of operation. Published figures indicate that its capacity is over half that of the Washburn-Crosby concern.

The Standard Milling Co. differs from the two already mentioned in that it does not have behind it years of successful development under individual ownership. It is a combination of a number of good-sized mills located in widely separated sections of the country. Organized in 1900, it paid no dividends on its common stock until 1912. Its published statements, however, report an increase in its surplus from $1,317,181, in 1904 to $4,060,506 in 1917. Its combined capacity is considerably over 30,000 barrels per day.

The Kansas Flour Mills Co. is said to have a capacity of about 15,000 barrels per day, and there are a number of other companies whose capacity approaches or exceeds 10,000 barrels.[32]

Apparently there are 10 milling companies which could under pressure produce half the flour made in the United States in an ordinary year. But in no case does actual output make any near approach to

[32] "Flour Mills," published by the Northwestern Miller, is the authority used as to the capacity of mills.

capacity. The estimated capacity of the country's flour mills is approximately two and one-half times the largest production in any year. This surplus capacity, which is characteristic of small concerns, is undoubtedly an important obstacle in the way of the many factors working toward concentration and possible monopolistic control of the industry.

COMPETITIVE METHODS.—In its preliminary report on flour milling and jobbing of April 4, 1918, the Commission commented on marketing conditions and practices as follows:

> The Commission's investigation disclosed that competitive conditions in the industry had developed some marketing practices on the part of millers which were open to criticism, but none that were particularly vicious. Such practices as did exist have been largely done away with for the duration of the war by the regulations of the United States Food Administration.
>
> * * * * * * *
>
> One of the worst evils of the flour business is the multiplication of brands, many of which are not identified by the name of any concern. Heavily advertised brands usually bear the name of the manufacturer or the distributor, but there are a large number of brands sold that bear no name to which responsibility for poor quality can be attached. It is on such brands that price cutting is apt to be most objectionable.
>
> The pure-food law requires the correct weight to be put on the sack, but does not require the name of the manufacturer or distributor. It would undoubtedly make for much better marketing conditions in the industry if such identification of all flour sold were required.
>
> The worst practice found among distributors was that of contracting ahead for as large a quantity of flour as the mills would sell, with the intention of calling for deliveries if the price went up but of repudiating their obligations if the price went down. This practice was almost entirely confined to more or less irresponsible concerns attracted into the business by the prospects of large profits. It has been effectually prevented for the duration of the war by the regulations of the Food Administration, which forbid mills to sell flour more than 30 days ahead of actual delivery.

After the issue of the report above referred to, and for a period extending beyond that covered by the present report, the flour-milling industry went so completely under the control of the Food Administration both as to profits and methods of doing business that it did not seem necessary for this Commission to make further inquiry in this direction.

Section 5. Millers' Associations.

The Commission has made no investigation of the organization and practices of associations in the flour-milling industry. There are, however, certain facts, commonly known to the trade, which are worth noting in this report. Associations have been organized in at least 18 different States. (See Exhibit IV.) Most of these associations cooperate in interstate or international work through the Millers' National Federation. Various other group or sectional associations are noted below with brief mention of the character of their activities. The flour trade also has local clubs in active operation in a number of the larger cities.

MILLERS' NATIONAL FEDERATION.—The proceedings of the 17th annual meeting of the Millers' National Federation, held in Chicago, April 11, 1919, indicate the character of the activities of the federation. Plans for the operation of the mills of the country under the Wheat Director's administration of the wheat price guaranty law was the principal topic discussed by the convention. The fact that the report of the special legislative committee on this subject was presented by the former head of the milling division of the Food Administration is in itself significant of the federation's influence on matters that were of vital importance not only to the millers of the United States but also in their effect on the food supply of the country during the war. Other members of this special legislative committee were divisional chairmen of the milling division.

It was reported to the convention that the audit of millers' accounts was taken up with the Enforcement Division of the Food Administration soon after the armistice was declared, and that an agreement was reached in January, 1919. On cancellation of the Food Administration regulation of contracts, December 23, 1918, the federation requested its members to continue to observe the same rules until the committee on these subjects could act.

The secretary reported to the convention that it was believed that the committee regulations based on those of the Food Administration and issued early in 1919 had been quite generally observed. Considerable work had been done on export trade conditions, especially work relating to Cuban restrictions on imports of flour from the United States, and to improved port facilities for handling flour. In addition to the above activities, other committees appeared to be continuing assignments including Federal and State legislation, transportation conditions, and grain standardization and inspection.

Information in regard to the officers and committees of the federation is given in Exhibit IV.

COMMUNITY MILLERS' ASSOCIATION OF AMERICA.—Mills of 300-barrel capacity and under have recently organized the Community Millers' Association of America. In their address to the Wheat Director, adopted at their annual meeting in May, 1919, they claimed that their association was "the only representative body of the small millers in this country." The ambitious character of this new association's activities is indicated by the following list of projects undertaken at this meeting:

1. Presentation of wheat guaranty administration plan to Mr. Barnes (the Wheat Director).
2. Insistence on representation of the smaller mills before Mr. Barnes on the same numerical basis as the large mills.
3. Attack on the milling in transit system.
4. Advocacy of Federal credit to community millers.
5. Organization of the entire body of small millers, estimated to include 11 out of 12 of all millers in the country.

Those who have been most active in establishing this new association are owners of self-contained small mills. The builders of such mills have also done much to get the association well started. However, owners of standard type mills up to 300-barrel capacity were well represented at the recent convention. (See Exhibit IV.)

The Millers' Export Association (Inc.)—This association was incorporated on July 22, 1919, for the purpose of promoting trade in American wheat flour in foreign countries and improving and developing facilities for the handling and transportation of wheat flour exports. It was the purpose of this organization to act as agent for its members in dealing with the United States Grain Corporation and governmental flour-buying agencies of other countries. The agreement under which it operated was canceled, however, as of May 20, 1920. (See Exhibit IV.)

Other Associations.—The soft-wheat millers of the Ohio Valley are organized in separate State associations, but their common interest in matters such as the margin allowed by the Food Administration for converting wheat to flour brings them into joint convention occasionally.

Southwestern millers also have their own peculiar problems which are divided between the Southwestern Millers' League, which has a very large membership among southwestern millers, and the Millers' Exchange located at Kansas City. Maintenance of the existing parity of freight rates and traffic regulations between different sections appears to be the special task of the former; mutual insurance of sales contracts is undertaken by the latter. The league also distributes information on State legislation and represents its members before various public bodies. The exchange, besides its contract insurance business, distributes a compilation of sales data, including prices which are reported by its members who are located principally in Kansas, Oklahoma, Missouri, and Nebraska. (See Exhibit IV.)

The distribution of details of actual sales reported by their different members also appears to be an important feature of the work of leading State associations, as for example, Ohio and Indiana.

Association work on the Pacific slope is divided between the North Pacific and the South Pacific Associations. (See Exhibit IV.)

Chapter II.

COSTS, PRICES, AND PROFITS.

Section 1. Prices of wheat flour.

The tables of relative prices of the Bureau of Labor Statistics of the United States Department of Labor afford interesting comparisons between prices of wheat flour and other commodities. Broadly they indicate that during the advance in prices from the low level of the nineties there has been, relatively, a larger supply of food than of other commodities. Although the output of other commodities has increased more rapidly than the output of food, demand for those commodities has apparently increased still more rapidly. Consequently, with a single exception in more than 20 years, the average relative wholesale price of the 15 articles of food included in the tables of the Bureau of Labor Statistics has each year shown less advance above the low level of the nineties than is shown by the average annual price of all commodities covered by the tables.

Until 1915 flour generally shared with other foods this tendency to advance in price less rapidly than other commodities. Indeed, the flour prices published by the Bureau of Labor Statistics, both wholesale and retail, for the four years 1911–1914 were relatively much lower than those of food in general. Beginning with 1915, however, flour prices advanced rapidly, with the result that in 1918 its relative wholesale price was apparently not only higher than the relative average wholesale price of food, but also higher than that of all other commodities. The indicated advance in relative retail prices had apparently not yet brought that for flour up to a level with those for other foods in 1919, but according to the latest available figures, in the spring of 1920 their relative advance above their average in the nineties would have equaled that for foods generally if the prices of sugar and potatoes had not advanced phenomenally.

The course of flour prices during the five years covered by this report is of such interest as to warrant a comparison of the changes from year to year, not only for flour but also for wheat. The following table shows retail, export, and wholesale prices of wheat flour per barrel for the mill years 1913–14 to 1917–18, inclusive; the average receipts per barrel for flour sold by 37 large commercial milling companies (see p. 57), their receipts for feed per barrel of flour sold, and the cost of the wheat they used in making a barrel of flour; the estimated receipts by farmers throughout the United States for the same quantity of wheat and also their average receipts per bushel.

TABLE 14.—*Retail, export, and wholesale prices of wheat flour, millers' receipts for flour and feed, millers' cost of wheat, and farmers' receipts for wheat, per unit figures, 1913-14 to 1917-18.*

		Mill or fiscal year.				
		1913–14	1914–15	1915–16	1916–17	1917–18
Retail price per barrel [1]	dollars	5.76	7.41	7.20	10.92	12.54
	per cent	100	129	125	190	218
Export price per barrel [2]	dollars	4.61	5.86	5.63	7.80	11.19
	per cent	100	127	122	169	243
Wholesale price per barrel [1]	dollars	4.22	6.02	5.61	9.98	10.53
	per cent	100	143	133	237	250
Millers' receipts for flour per barrel [3]	dollars	4.15	5.55	5.25	8.55	10.22
	per cent	100	134	127	206	246
Millers' receipts for feed per barrel [4]	dollars	.77	.84	.77	1.26	1.30
	per cent	100	109	100	164	169
Millers' receipts for flour and feed per barrel	dollars	4.92	6.39	6.02	9.81	11.52
	per cent	100	130	122	199	234
Millers' cost of wheat per barrel	dollars	3.96	5.42	5.09	8.32	9.72
	per cent	100	137	129	210	246
Farmers' receipts for wheat per barrel [5]	dollars	3.50	4.47	4.45	6.62	9.10
	per cent	100	128	127	189	260
Farmers' receipts per bushel [6]	dollars	.79	.99	.98	1.44	2.05
	per cent	100	125	124	182	260
Index number		100	131	125	198	239

[1] Data from Bureau of Labor Statistics of the Department of Labor.
[2] Statistical Abstract of the United States, 1918, p. 575.
[3] Average receipts per barrel received by 37 large commercial milling companies.
[4] Average amount received from sales of feed per barrel of flour sold by 37 large commercial milling companies.
[5] Average receipts per bushel multiplied by the number of bushels used per barrel of flour by 37 large commercial milling companies.
[6] Monthly Crop Report, Department of Agriculture, October, 1918, p. 127.

Any comparison of the course of flour prices during the period covered by the above table must rest primarily on the relation of flour prices in 1913–14 to prices of other commodities and to former prices of flour. It has already been noted that during the four-year period, 1911–1914, prices of flour were much below the general level of prices. The fact that in 1913–14 they were still at a low point is emphasized by noting that while the millers' receipts for flour per barrel shown in the table is only $4.15, the average mill value of flour produced in 1889, according to the reports of the Bureau of the Census, was $4.33. This comparison alone, however, might lead to misapprehension if account is not taken of the fact that during the low-price decade of the nineties flour prices declined more relatively than other prices and their decline continued throughout a longer period, with the consequence that the average mill value of flour made in 1899, according to the Census, was only $3.35. Recognition of the relatively low price of flour in 1913–14 renders the considerable increase from that year to 1917–18 less striking than it would be if flour prices of the first year of the period were relatively as high as prices of other commodities.

In order to get a broad view of the changes in the closely related group of prices in Table 14, index numbers have been computed by adding together the prices shown for each year and dividing the totals for the last four years by the total for 1913–14. These index

numbers indicate a general advance of 139 per cent for the related prices in the group covered by Table 14 during the five years from 1913–14 to 1917–18. The advance of 31 per cent in the second year of the period was, of course, due to a sudden increase in demand following the opening of the European war in the summer of 1914. Events proved that under ordinary conditions of ocean transportation there would be an abundant supply of wheat and flour for the warring nations of Europe. This is indicated by the fall in the index numbers of Table 14 from 131 during the first year of the war to 125 during the second year. The result of the above conditions is that during the first two years of the war prices of flour and wheat show a relatively small advance compared to those of the last two years covered by the table.

The year 1916–17 opened with prices still at a relatively low level. European Governments, however, all recognized the fact that there would probably soon develop conditions in ocean transportation which would limit their practically available sources of wheat flour to the American continents and, in a considerable degree, to North America. Largely due to their provision for this emergency by contracts for wheat and flour for future delivery a scarcity of cash wheat developed which resulted in the flour and wheat panic of the spring of 1917. The effects of this panic are shown in the increase in the average retail price of flour from $7.20 in 1915–16 to $10.92 in 1916–17 and in the index number for all the items from 125 in the former to 198 in the latter year.

The data shown in the table for 1917–18 are typical of conditions in the wheat and flour market of the United States under Government regulations during the war. Although the index number shows an increase of 20 per cent over the preceding year, if comparisons were made with prices at their high point in the last half of 1916–17, a decrease would be shown instead of an advance.

Table 14 shows that the retail price of flour as represented by the Minneapolis and Kansas City data of the Bureau of Labor Statistics advanced from $5.76 in 1913–14 to $12.54 in 1917–18. This increase of nearly $7 in the price is indeed striking, but comparison with the index number for the group shows that the retail price advanced only 118 per cent in comparison with 139 per cent for the group as a whole. To put the contrast more strongly, the advance shown for the retail price of flour is considerably less than is shown for any other item in the table except millers' receipts for feed. The changes in prices at retail from year to year were similar to those indicated for the group as a whole. In each year the tendency of retail prices to lag behind wholesale and manufacturers' prices is evident. For example, although millers' receipts for flour were 34 per cent higher in 1914–15 than in the preceding year, the advance in the retail price

was only 29 per cent, but in the following year although millers' receipts, as indicated by the index number, went down from 134 to 127, the retail price declined only from 129 to 125. At this point it showed exactly the same advance from the 1913–14 level as is shown by the index number for the entire group. In 1916–17 it again failed to keep up with the advance in other prices, although as the table shows its index number for that year is only 8 points below that for the group as a whole. During the critical war year, 1917–18, the retail price showed no such advance as other prices in the table. This is indicated by an increase of only 28 points in its index number in comparison with an increase of 41 points for the group as a whole, and of 78 points in farmers' receipts per bushel of wheat.

According to Table 14 the average price of flour exported from the United States advanced from $4.61 in 1913–14 to $11.19 in 1917–18. Its index number shows an increase of 143 per cent or 4 points in excess of the index number for the group as a whole. It is interesting to note that this last year of the war, when the attention of the Government was of necessity brought to bear on the situation in the flour market, is the only year in which export prices show as great an advance as the group as a whole. In the years 1914–15 and 1915–16 the differences between the increase in export prices and average prices for the other items was not particularly notable, although in the former year the export price fell below the average wholesale price and in the latter year was only 2 cents above it.

It is the year 1916–17, however, which affords the most striking contrast between the movement of the export price and other prices in the group, as is indicated by an advance of only 47 points in the export price index number in contrast with an advance of 73 points in the index number for the group as a whole, and of 104 points in the wholesale price shown in the table. This is, of course, the result of the large contracts for future delivery purchased by foreign buyers in the early part of 1916–17, to which reference has already been made.

Foreign trade statistics of the Bureau of Foreign and Domestic Commerce afford an interesting illustration of the advantage derived by England from the correct forecast of future demands for flour by its representatives. These statistics show that the average export price on flour sent to England in 1916–17 was 66 cents per barrel less than on that sent to other countries, but that in the following year it was 5 cents per barrel more. Turning again to the general averages, it is interesting to note that in 1916–17 the export price was 75 cents per barrel less than the average millers' receipts for flour shown in the table, while in 1917–18 it was 97 cents per barrel more.

Table 14 shows an increase in the wholesale price, also based on the Minneapolis and Kansas City data, from $4.22 in 1913–14 to $10.53 in 1917–18. This is an advance of 150 per cent, or somewhat more than the advance for the group as a whole. The difference, however, is not more than may be accounted for through the specialized character of the wholesale price as compared with prices for the entire group. The difference between the wholesale price and the average receipts of the millers is still narrower if the advance in prices over the entire period is taken, since there is a variation of only 4 points between the index numbers for the two prices in 1917–18. Nevertheless, the increase in the margin between the wholesale prices and the millers' receipts from 7 cents in 1913–14 to 31 cents in 1917–18 should be noted. A comparison of the intermediate years indicates, however, that the margin between the wholesale price and the millers' receipts in 1913–14 was probably exceptional, yet hardly so much so as the difference of $1.43 found in 1916–17. The low relative receipts of the millers as compared with the wholesale price in 1916–17 is apparently due to contracts for future deliveries in that year of rapidly advancing prices which have already been mentioned as responsible for the low index number for the export price.

Average millers' receipts should in general be almost as good an index of fluctuations in the price paid as wholesale prices per barrel and, as already noted, the advances in the wholesale price and in millers' receipts over the entire period were practically the same. The actual cost of flour during these years was in all probability somewhere between millers' receipts and the wholesale price shown by the table, since the price paid must include freight and middlemen's charges in addition to millers' receipts whenever the flour is handled by the wholesale merchant.

Millers' receipts for feed show the smallest advance of any item included in the table. The figure for 1917–18 is hardly 70 per cent in advance of that for 1913–14, the indicated increase in price being barely half that shown for the group as a whole.

Neither millers' receipts for flour nor for feed alone afford an index to the effect of price changes on the prosperity of the millers. A better index is found in the fluctuations of the combined receipts for flour and feed. Table 14 shows that this amount advanced less, relatively, than average prices for the entire group in every year except 1916–17. For the five-year period its advance was only 134 per cent, as compared with 139 per cent for the group as a whole. This difference is, of course, so small that it can not be accepted as an indication that the miller's receipts in general did not keep fairly in line with the advance in prices paid by him for his raw material and received by the merchant on resale of flour. It is true that the

general indication of the table is that wholesale prices advanced more rapidly than the miller's receipts for his entire product. This difference would have been much less in some years if wholesale prices had been compared with the miller's receipts from domestic sales instead of with his combined receipts from exports and domestic sales shown in the table.

An interesting feature of Table 14 is the narrow margin between the cost of the wheat used in producing a barrel of flour and the average receipts of the miller for that flour. In 1914–15 this margin was only 13 cents, yet it will be shown later that that was a relatively prosperous year for the miller. The explanation is in the high price of feed in 1914–15 as compared with the preceding and following year. In 1915–16 receipts for flour exceeded cost of wheat by 16 cents and in the first year of the period by 19 cents. In 1916–17, a year of great prosperity for the miller, his receipts for flour exceeded the cost of wheat by only 23 cents. The table shows, however, that under Government regulation in 1917–18 this difference was increased to 50 cents. The necessity of this greater margin in 1917–18 is at once evident if it is noted that there was an increase of $1.40 in the miller's cost of wheat but an increase of only 4 cents in his receipts from the feed made from that wheat.

A better test of the relation of the miller's cost of wheat to his prosperity is found by comparing the relative advance in the cost of his wheat with his combined receipts for flour and feed. Table 14 shows that while the cost of his wheat advanced 146 per cent during the period, his combined receipts increased only 134 per cent; that is, he was in a somewhat less favorable condition in regard to the cost of his raw material in 1917–18 than he was in 1913–14. Comparison of the figures throughout the period, however, indicate the possibility that the cost of wheat to the miller in 1913–14 may have been exceptionally high, since there is an increasing tendency for the advance in total receipts to fall behind that of cost of wheat from year to year.

Prices paid the farmer for his wheat advanced more slowly than the other prices in the table until 1917–18, in which year the Government-stabilized price of wheat shows an advance of 160 per cent above the 1913–14 level, in contrast with the 139 per cent advance for the group as a whole. A more interesting comparison, however, is that between the farmer's receipts for the quantity of wheat put into a barrel of flour and the cost of that same quantity to representative millers. To illustrate, the table shows that in 1916–17 this wheat cost the miller 110 per cent more than it did in 1913–14, but the farmer, according to the table, got only 89 per cent more for it. The margin between the farmer's receipts and the miller's cost in 1913–14 had been only 46 cents, but in 1916–17 it had increased to $1.70.

In making these comparisons it must always be remembered that the wheat price used is an average estimated price for all wheat sold in the United States, while the miller's cost is based on purchases of less than 30 per cent of the total crop. It is probable, however, that the receipts of the farmer for the 30 per cent and for the entire crop over a series of years will have a nearly parallel movement. Comparisons based upon the data in Table 14, therefore, merit consideration so long as better sources of information are not available.

Keeping the above limitations on the data in mind, the following table of relatives based on millers' receipts, millers' cost of wheat and farmers' receipts for wheat is instructive:

	1913–14	1914–15	1915–16	1916–17	1917–18
Millers' receipts	100	100	100	100	100
Millers' wheat cost	80	85	85	85	84
Farmers' receipts	71	70	74	68	79
Other wheat costs	9	15	11	17	5

Because of the Government's stabilization of wheat prices throughout the country in 1917–18 the figures for that year are unquestionably more worthy of confidence than those for the other years. The general showing, however, that transportation expenses, storage charges, and the profits of the wheat holders constituted practically twice as large a part of the consumer's price of flour in 1916–17 as in 1913–14, appears altogether probable. Furthermore, the increase in relative farmers' receipts from 68 in 1916–17 to 79 in 1917–18 is fairly positive proof of the advantage to the farmer of Government regulations during the war so far as such regulations affected flour and wheat. It would be entirely unwarranted, however, to assume that the relation of these figures to each other is any exact measure of the benefit received by the farmer. Increased costs of transportation and storage accounted for part of the greatly increased difference between farmers' receipts and millers' costs in 1916–17, but most of it was unquestionably absorbed by the holder of wheat during the panic that reached its climax in May, 1917, when wheat was sold in Chicago for $3.45 per bushel.

The extraordinary speculative margin shown above for 1916–17 sales calls for close observation of the relation of farmers' receipts to millers' costs in other years. According to the Department of Agriculture the farmer was getting 99 cents a bushel for his wheat on July 1, 1912, and only 79 cents nine months later. The Commission has incomplete data pointing to a margin between farmers' receipts and millers' costs in that year of about 20 cents per barrel; that is, the 20 per cent decline in wheat prices had reduced the margin to a minimum. Speculative holding of wheat that year,

whether by farmer or trader, was unprofitable. The trend of the market in 1913–14 was again downward, and the farmers' price fell from 81.4 cents at the beginning to 76.9 cents at the end of the year. The margin between farmers' receipts and millers' costs that year was 46 cents. The much smaller decrease in the farmers' price during the year had allowed the margin to double, but still kept it relatively small.

These two succeeding years of declining prices, together with the advance of the farmer's price to $1.078 on January 1, 1915, in the face of a crop over 125 million bushels larger than had ever before been raised in the United States, sufficiently explain why the farmers sold 615 million bushels of wheat in the first six months of 1914–15 and had only 189 million bushels left to sell in the other six months of the year. The consequent small sales in the next four months resulted in an advance of the farmer's price to $1.396 on May 1, 1915. On account of the early marketing of the crop, however, although the average cost to representative commercial millers was $5.42, farmers throughout the country received on an average only $4.47 for the quantity of wheat used in a barrel of flour. The relation between the advancing price and the increased margin seems clear.

The influence of these heavy speculative gains is evident in the relatively smaller sales by farmers in the early part of 1915–16. But the billion-bushel wheat crop of the United States, reinforced by extraordinary increases in the production of Canada and Australia, drove the farmer's price down from $1.396 on May 1, 1915, to $1.025 on May 1, 1916. The margin between the farmer's receipts and the miller's costs dropped back, as was to be expected, from 95 cents in 1914–15 to 64 cents in 1915–16.

The farmer must have been strongly impressed by the losses on speculative holdings of the 1915 harvest. His wheat marketing in the fall of 1916 was relatively heavier than it had been even in 1914. The average farm price on August 1, 1916, was $1.071 and his sales that month amounted to 111 million bushels. Consequently, although the average farm price went up to $2.485 on June 1, 1917, he had only 13 million bushels left to sell that month. The effect on the margin between the farmers' receipts and millers' costs has already been noted. The farmers of the United States would probably have held much of the wheat they sold in the early part of 1916–17 if they had known as much of prospective ocean transportation conditions as was known by European purchasers of wheat and flour.

This brief review of price fluctuations shows the cause of the profit realized in holding wheat of the 1914 and 1916 crops, and also explains why the farmer could not have been expected to store his

wheat and share in this speculative gain. It should not be forgotten, however, that storage, transportation, and incidental charges were also advancing.

Section 2. Cost of selling flour.

MILL SALES.—Fluctuations in the price of flour, such as those discussed in the preceding section, are by no means entirely due to changes in the costs and profits of the millers. The flour trade of the country must be taken into consideration as well as the flour industry. The large toll paid to the railroads, already referred to on page 11, also constitutes part of the costs of distribution included in the price paid by the consumer.

The mills, of course, are engaged in the flour trade. Many sell direct to consumers, many sell to bakers. Some distribute large quantities of flour to the dealers through their branch houses. Unfortunately the accounts examined by the commission were not in sufficient detail to permit a satisfactory segregation of selling expenses from the general expenses. Therefore, they are included in the general expense of operation in the discussion of millers' costs.

The question of the cost of distribution has, however, assumed special importance in the relations between the Food Administration and the millers. In fact, it was necessary to establish certain contract allowances for the different trade services of the miller to different classes of customers. These allowances, of course, are intended to cover profits as well as costs. Furthermore, it is probable that they are considerably above a normal average charge for the services which they cover. Otherwise, a large number of mills, whose costs are above the average, might have been driven out of the business, and it has evidently been the purpose of the Food Administration and the Grain Corporation to put no regulations into effect which would be injurious to business concerns on whose services consumers in their own immediate vicinity were dependent in normal times, unless public interest compelled them to do so.

The charges allowed in the contract between the Grain Corporation and the millers are of practical importance, however, even though they represent a presumable maximum of costs and reasonable profits in the selling of flour at wholesale and retail. For that reason they are shown below:

	Per barrel.
Deliveries in carload lots	$0.15
Deliveries in mixed carloads (part flour, part feed)	.40
Sales from cars or docks, car lots (not delivered) of flour forwarded "on consignment"	.40
Sales from cars or docks, less than carload (not delivered) of flour forwarded "on consignment"	.50
Sales in less than carload lots (not to consumer)	.65
Sales to consumers (not bakers or public eating places)	1.35

THE FLOUR TRADE.—Aside from the mills and their branch houses, the flour trade includes many wholesale grocers, most retail grocers, brokers, and car-lot and less-than-car-lot flour jobbers. As the milling of flour has concentrated in the hands of the larger concerns the quantity of flour sold by mill agents and mill branches has increased, and the flour business of other distributors has decreased. An increase in the number of bakers able to buy in carload lots directly from the mill has also cut down the sales of other distributors. Many small bakers continue to buy of their local jobbers because they obtain credit from them that the mills are not willing to grant.

The flour trade performs the usual functions; that is, it takes care of the transportation, storage, and deliveries of flour, and grants credit to purchasers. Storage in the flour trade tends to decrease; direct deliveries from cars to small traders and consumers to increase. Cartage, the largest single item of expense, and other delivery charges are advancing. Very little credit is granted in the car-lot business, but losses on account of bad debts have in the past been a considerable item in the accounts of jobbers who sold to small local bakers.

The margin between purchase and sales prices for different distributors and at different times has little consistency. Big jobbers whose business operations do not extend to storage and cartage, usually have small expenses, and at times their margin is small—much smaller than that of equally large operators who, in addition to customary trade services, blend the flour of different mills to produce the qualities demanded by their trade. Occasionally, the profit of the first class of jobbers referred to above will contain a large amount of speculative gain, resulting in a margin much greater than that of concerns whose expenses cover the semi-industrial operations involved in blending, testing, warehousing, handling, and lightering.

GROCERS' FLOUR TRADE.—Practically all the flour consumed in individual households is sold by retail grocers. The retail grocers themselves buy much of this flour from wholesale grocers but, also, a considerable part of it directly from the millers. There is, however, in most cases, no satisfactory method of separating the grocer's flour expenses from his other expenses. For this reason, and because of the magnitude of the work, it was not deemed advisable to undertake to determine the margin of profit on sales of flour either in the wholesale or retail grocers' trade.

CAR-LOT FLOUR JOBBING.—The accounts of five car-lot jobbers selling in the aggregate from a million to a million and a half barrels of flour annually were examined over a five-year period. The business of these different concerns varied so greatly and, in the last of the five years, business in flour substitutes was so confused with wheat-

flour business, that no statistical presentation of costs and profits for this group has been attempted.

The data show, for example, that receipts for one very large car-lot jobber increased from $4.59 per barrel in the calendar year 1914 to $13.24 in 1917—an increase of 188 per cent over the period. The sales of another car-lot jobber doing a good business showed an increase in net receipts per barrel from $4.56 to $9.04, an increase of less than 100 per cent. It is evident that such data could not be combined unless they were sufficiently comprehensive to give assurance of representative results, and this was not the case.

It is of interest to know, however, that the business of the first jobber referred to above, which is apparently typical of a limited group of similar large concerns, was done on an expense of 4 cents (no allowance being made for proprietors' salaries) and a net profit of 10 cents per barrel in 1914; and that these figures had increased respectively to 7 cents and 46 cents in 1917, dropping back to 5 cents and 14 cents in 1918. The large profit in 1917 was undoubtedly due to the highly speculative conditions of that year.

Car-lot jobbing expenses for individual concerns, according to the accounts examined, varied from the 4 cents per barrel in 1914, already noted, to 37 cents per barrel for a blending concern over a 17-months' period from August 1, 1917, to December 31, 1918. Excluding the extreme figures just noted, expenses shown by the different accounts ranged from 5 cents to 16 cents in 1914 and from 6 cents to 19 cents in 1918.

All accounts showed a relatively high net profit in 1917. The business as a whole probably made twice its normal profit in that year. None of the concerns showed a net loss in any of the five years. In fact, the minimum profit did not fall below 10 cents per barrel, but in a great majority of cases it was less than 20 cents per barrel.

On the whole the accounts examined indicate that the normal gross margin for car-lot jobbers ranged between 15 and 40 cents per barrel, largely depending on the nature of the business done by the different concerns. In 1917, however, the gross margin shown in the accounts examined ranged from 30 cents to 59 cents per barrel. In 1918 margins were more normal, the accounts showing 18 cents as a minimum and 50 cents as a maximum.

Less than car-lot jobbing.—The Commission examined the accounts of New York jobbers selling flour in less than car lots, whose sales in the aggregate exceeded 2,000,000 barrels annually. The character of the business done by the different concerns varied greatly. The relations of certain concerns with the big mills distinguished their business sharply from that of their competitors. Others confined their sales almost entirely to small bakers. Because of difference in customers and services rendered them, there was a

considerable variation in prices, profits, and expenses. One small concern showed a net loss of 21 cents per barrel in 1917, while the others showed net profits ranging from 13 cents to 94 cents.

Because of these differences in the character of the business done by different concerns, and because methods of accounting did not make a satisfactory segregation of flour receipts and expenditures possible, the figures presented below should not be regarded as typical of all jobbing sales in less than carload lots, nor as exactly accurate for the business covered. They do, however, cover so large an amount of business and with such an approximation to the actual results of business done in flour alone, that there can be but little question of their practical utility for comparative purposes.

TABLE 15.—*Average receipts, costs, gross margin, expense, and profit on certain New York jobbers' sales of wheat flour in less than carload lots, by years, 1914–1918.*

Calendar years.	Sales covered.	Receipts.	Flour costs.	Gross margin.	Expense.	Profit.
	Barrels.			*Cents.*	*Cents.*	*Cents.*
1914	1,694,607	$4.86	$4.45	41	25	16
1915	2,124,703	6.43	6.00	43	27	16
1916	2,357,761	6.65	6.10	55	32	23
1917	2,129,858	10.85	10.06	79	44	35
1918	2,550,439	11.47	10.92	55	39	16

The table shows that just before the war wheat flour was selling to small traders and to bakers in New York City for a little less than $5 per barrel. There was some fluctuation in the flour market on the one hand because of the increased European demand directly after the outbreak of the war and on the other hand because of the larger wheat crops in Canada and Australia in 1915. The net effect of these fluctuations on the New York flour market for 1915 and 1916 appears to have been an advance of about 33⅓ per cent in the prevailing wholesale prices of flour in those two years as compared with prewar prices. The price shown for 1918 was 135 per cent higher than that shown for 1914. This probably indicates with a fair degree of accuracy the upper limit of the war's influence on wholesale prices in New York City. It is interesting to note that while the rate of increase shown here for the New York price over the five-year period was less by 14 per cent than the rate shown for the wholesale price of flour in Table 14, the amount of increase was $6.61, or 30 cents more than the $6.31 shown in that table.

The table shows the jobber's purchase price for flour advancing at a more rapid rate than his selling price. As a result, during the five years covered, the margin between costs and receipts advanced barely 35 per cent. In the exceptional year, 1917, it was not far from double what it had been in 1914.

Just as purchase price encroached on price received, expenses encroached on margin realized. Consequently, in spite of the increase of 35 per cent in the margin the net profit shows no change. In 1914 and in 1915 it had been 16 cents per barrel and although it advanced to 35 cents in 1917, in 1918 it fell to 16 cents again.

Probably the most important showing of the table, and the one that can be accepted with the most confidence, is the increase in expenses of fully 50 per cent, from 25 and 27 cents in the first two years to 44 cents in 1917 and 39 cents in 1918. It should be noted that the excess of expense in 1917 over 1918 was probably due to charging off an accumulation of bad debts in that year.

The accounts of several Boston jobbers who sold flour in less than car lots were examined. They are open to the same criticisms as those made in regard to data collected in New York, but they, nevertheless, substantiate in a general way the conclusions in regard to the course of prices, costs, and profits drawn from the table on page 53. Where there are differences of any moment in the first three years they are quite clearly due to the exceptional results obtained by one or two concerns either in one city or in the other. In 1917, however, three or four New York concerns made very high profits and there is little doubt that (including these exceptional cases) less than car-lot jobbing was more profitable in New York in 1917 than it was in Boston.

Some data on flour jobbing in less than car lots were obtained for other large cities east of the Mississippi River. These also support the more comprehensive data obtained for New York. Larger profits in 1917 and in 1918 were found in some other cities than in New York. It was not clear, however, that the differences might not be due to differences in the character of the business done.

Section 3. Flour-mill accounts.

The success of cost and profit inquiries of necessity depends on the completeness and accuracy of the records and accounts of the concerns whose costs and profits are examined. Since the rate of profit on investment is of prime importance no strictly accurate report on flour-mill profits in the United States can be made unless the amount of capital invested can be determined with a fair degree of accuracy. The experience of the accountants of the Commission, however, indicates that large numbers of milling concerns in the United States have no records from which their investment in mill building and flour plants could be correctly ascertained. One of the largest milling concerns east of the Mississippi when first visited by the Commission's accountants had no amount on its books representing investment in land, buildings, or machinery.

No satisfactory report on profits per barrel of flour for the entire country can be made as long as it is impossible to determine the

quantity and value of flour sold by the different mills; yet the Commission found mill after mill whose record of sales made no distinction between flour, feed, and other products prior to beginning their reports to the Food Administration. It was, therefore, necessary to separate a large volume of flour sales from sales of other products in order to obtain sufficient price information to be fairly representative.

In the matter of costs a seemingly insurmountable obstacle was encountered in mill after mill because flour, feed, and other products had not been segregated in the inventories. In less frequent cases the same difficulty was met in inventories of raw materials. Only through the cooperation of the millers were the accountants finally able to make these segregations in a sufficient number of mills to meet absolutely necessary requirements. Other difficulties with the accounts were also encountered. Items of overhead expense, such as depreciation, bad debts, etc., were ignored for several years in some cases and then adjusted in a single year. Instances were also found where the records pertaining to interest, insurance, and taxes were not definite with respect to the period covered.

Furthermore, cost accounts were seriously vitiated by the use of market value in the place of actual or average cost of grain, flour, and sacks in taking inventories. This bad accounting practice was defended as offsetting to some extent the equally bad practice of increasing or decreasing profits by the estimated profit or loss on unfilled orders. The latter practice is the more to be condemned because it transfers profits or losses from the year in which they are realized into the preceding year, while continuing to show the sales in the year in which the delivery is made. It was fortunately found possible, however, to place the wheat and flour inventories of the important companies on an approximate cost valuation, and all estimates of gains or losses on unfilled orders were rejected.

The Commission found that, on the whole, mill records for 1916–17 and 1917–18 showed a distinct improvement over those for the earlier years. Furthermore, there was a decided disposition on the part of the millers to carry the matter forward to a point where the accounts would show in some detail their actual operating results.

The year 1917–18, however, brought additional accounting problems due to the cooperation of the millers with the Food Administration. These complications affected the Commission's inquiry in two ways: First, a number of the Commission's accountants in cooperation with the Food Administration gave their entire time for several months to the monthly operating reports of the millers which were being made out to comply with the Government regulations. This work was continued until it was found that the Food Administration would be able to dispense with such assistance.

Second, the Food Administration's requirement of a separate accounting period running from September 1 or 10, 1917, to June 30, 1918, produced further complications in the accounts. This made it somewhat more difficult for the Commission to obtain data for the year 1917–18 that would be strictly comparable with information already collected for the preceding four years. Furthermore, the increase in the millers' accounting work because of their cooperation with the Food Administration made it desirable to reduce the time spent in the mill offices and the scope of the reports required from milling concerns to the lowest possible limit.

The problem presented to the Commission was the preparation of a report on the prices, costs, and profits of commercial flour mills during the years 1913–14 to 1917–18, which would furnish information of some practical value while at the same time due consideration was given to the situation outlined above.

Section 4. Scope of inquiry into costs and profits.

The conditions discussed in the preceding section called for a careful delimitation of the Commission's report on costs and profits in the flour-mill industry. Custom mills have no influence in the general commercial flour market, and therefore their costs and profits are immaterial in the consideration of the course of flour prices in commercial markets. The same is true of merchant mills whose average output, including custom work, amounts to only four or five barrels of flour per day throughout the year.

Passing to mills of considerable size, Table 13 shows that there were 4,297 concerns making from 1,000 to 20,000 barrels annually in 1914. An account of their operations would no doubt add to a complete comprehension of the situation as it exists at the present time, but the great number compared with the quantity of flour produced and the great difficulty in obtaining the data made it inadvisable to attempt to cover them.

Quite a different situation is found in the case of a few hundred large mills whose adaptation to the milling conditions existing in the United States for the past 20 years or more has enabled them generally to do a profitable business at prices which have been gradually eliminating a considerable proportion of their small competitors. It would have been desirable, therefore, to have had a full report on the operations of all mills making, say, above 200 barrels of flour per day. This, however, was found impracticable.

The accounts of the very large mills, however, are the ones that afford the most important information. As a matter of fact, 80 per cent of the people in the United States are dependent on mills outside their own States for a considerable part of their flour. Evidently, therefore, the prices they pay for flour depends largely on the costs and the profits of the millers in the great flour-producing centers,

whose flour they buy either because they prefer it, or because mills in their own locality are not able to produce the quantity of flour the community consumes. The surplus flour-producing States are found in three relatively small groups, 10 States in all, occupying territory designated in Chapter I as the Northwestern Selling Area, the Southwestern Selling Area, and the Pacific Selling Area. In those States by far the larger part of the output, especially of flour shipped out of the State, is produced by a limited number of large mills. Furthermore, the competition from the Pacific Selling Area does not affect in any considerable degree the prices paid for flour by over nine-tenths of the people of the United States,[33] because the heavy freight charges across the mountains more than counterbalance the advantages afforded these mills by the lower cost of wheat.

This situation indicates that a relatively small number of mills in the hard spring wheat territory of the Northwest and in the hard winter wheat territory in the Southwest together with a few concerns scattered throughout the mixed farming region stretching from the Missouri River to the Atlantic Ocean exert an important influence on the price of flour in the whole country east of the Rocky Mountains. During the panic of 1917, however, the frenzied demand of the consumer for flour at any price was the dominating influence in the market. In the very large territory referred to above as the "mixed farming region" there are also limited areas in which, under favorable wheat crop conditions, the price of wheat to local mills, especially if its quality is unusually good, enables such concerns to push sales of flour at prices which materially affect the profits secured by the large millers in these localities.

The scope of the report on costs and profits determined in accordance with the situation presented above is, therefore, limited to the following topics:

(1) A discussion of the operating results of a small group of large mills over the five-year period beginning with 1913–14 and ending with 1917–18. These mills were selected partly because their accounts could be used and partly because most of them are so situated that they are usually able to make advantageous use of hard wheat.

(2) A less extended discussion of prices, costs, and profits based on the accounts of the principal mills of the Pacific Northwest.

Section 5. The mills covered.

TERRITORIAL LOCATION AND KIND OF WHEAT USED.—Data on investment and the returns realized thereon, capable of fairly satisfactory use, were obtained from the accounting records of 37 com-

[33] Some business has been done by the Pacific coast mills in the cotton States.

panies, operating 86 mills,[34] located in territory extending from New York in the East to Billings, Mont., in the West, and from Duluth, Minn., in the North to Nashville, Tenn., in the South. These mills are divided into three groups, referred to hereafter as the Northwestern group, the Southwestern group, and the Eastern group. The 43 mills in the Northwestern group are owned by 12 companies. One of these companies also owns mills in the Southwestern group, and another operates in all three districts. The 24 mills in the Southwestern group are owned by 14 companies and an equal number of companies operate the 19 mills in the Eastern group.

Practically all of the mills belonging to the Northwestern group are located in Minnesota and North Dakota. The mills of the Southwestern group are nearly all located in the neighborhood of Kansas City or in the State of Kansas. A few mills in Missouri and in Oklahoma are included in this group because of the similarity of operating conditions. The Eastern group embraces mills located as far apart as Chicago and New York City, east and west, and Grand Rapids, Mich., and Nashville, Tenn., north and south.

The decisive consideration in the selection of these companies was the possibility of using their records in the compilation of information which could be accepted as reliable in a degree that would warrant comparisons between the results obtained by the different groups from year to year. Even this very moderate requirement made it necessary to reject the material collected from a considerable number of mills. It has, however, made it practicable to include some companies whose records were in certain respects unsatisfactory.

The mills included in the Northwestern group grind only a negligible proportion of soft wheat. Though it was impossible to obtain exact information on the subject, it appears probable that the proportion of soft wheat ground by the Southwestern group varies in different years from 10 to 20 per cent of all wheat ground, according to more or less favorable conditions for the use of soft wheat. The conditions referred to depend not only on the proportion of hard and soft wheat in the local supply but also on the relative excellence of the two kinds of wheat in the crop for any given year. The few mills in this group which grind considerable quantities of soft wheat have been included with the hard wheat mills because their prices, costs, and profits were not sufficiently at variance from those of the hard wheat mills to affect materially the average results shown for the group. It was desirable morever to make use of all available accounts representing the results obtained by commercial mills operating in that section of the country. These soft wheat mills were not put into a class by themselves because the results shown by their records could not be accepted as typical for any larger selected group of soft wheat mills and because comparisons of results shown for these mills

[34] One mill, operated independently until 1918, is considered as belonging to its present owners throughout the five years.

themselves, from year to year, would not be satisfactory. It is believed, however, that in putting the hard and soft wheat mills in one group any error in the accounts that has not been eliminated will not appreciably affect the averages for the entire group.

The information in regard to the proportion of hard and soft wheat used by the mills composing the Eastern group is still more indefinite than for the other two groups. It is not improbable that in some years more soft than hard wheat is used. But hard wheat is always used to a very large extent by mills located in the northwestern part of this section and those located on the natural route from the hard wheat regions of the West to the seaboard. On the other hand, mills located in the southern part of the territory occupied by this group use soft wheat almost exclusively and those scattered throughout the territory between use hard and soft wheat in proportions dictated by the conditions of supply. Exhibit V shows the proportion of hard and soft wheat used by certain mills grouped territorially. The mills from which this information was received are not all included in the group of 37 whose accounts were used in preparing that part of this report dealing with costs and profits.

CONSUMPTION OF WHEAT AND OUTPUT OF FLOUR.—Information in Exhibit III indicates that mills located in the hard wheat States were increasing their output faster than mills in the other States during the years 1899 to 1919, inclusive. Furthermore, Table 13 shows that the large commercial mills were doing a considerably greater proportion of the wheat-flour business of the country at the beginning of the war than 10 years before. The information in the following table in regard to production and sales of the 37 companies whose operations are to be discussed was compiled from the records of the companies. It indicates that since 1914 this process of localization and concentration has been more or less interrupted. For that reason this table is presented for consideration before proceeding to the discussion of the investment of these mills and the return realized thereon.

TABLE 16.—*Wheat consumption, flour and feed production, and flour and feed sales of the 37 selected companies, mill years 1913–14 to 1917–18.*

	1913–14	1914–15	1915–16	1916–17	1917–18
Wheat used (1,000 bushels)	168,062	170,311	198,892	165,568	150,464
Northwestern group	119,471	112,127	139,782	114,063	101,074
Southwestern group	21,170	26,173	28,010	27,750	24,313
Eastern group	27,421	32,011	31,100	23,755	25,077
Flour produced (1,000 barrels)[1]	37,985	37,699	43,761	35,991	33,901
Northwestern group	27,167	24,806	30,848	24,608	22,960
Southwestern group	4,695	5,801	6,098	6,130	5,346
Eastern group	6,123	7,092	6,815	5,253	5,595

[1] In addition to this the production of rye, corn, barley, and rice products in 1917–18 was as follows:

	Barrels.
Northwestern group	4,685,683
Southwestern group	302,256
Eastern group	538,480
Total	5,526,419

TABLE 16.—*Wheat consumption, flour and feed production, and flour and feed sales of the 37 selected companies, mill years 1913–14 to 1917–18*—Continued.

	1913–14	1914–15	1915–16	1916–17	1917–18
Feed produced (1,000 tons)	1,358	1,398	1,673	1,496	1,227
Northwestern group	955	911	1,173	1,055	822
Southwestern group	180	223	240	243	205
Eastern group	223	264	260	198	200
Flour sales (1,000 barrels)	38,450	38,231	43,430	36,777	34,659
Northwestern group	27,272	25,090	30,364	25,145	23,114
Southwestern group	5,003	5,878	6,137	6,202	5,712
Eastern group	6,175	7,263	6,929	5,430	5,833
Feed sales (1,000 tons)	1,364	1,405	1,672	1,501	1,243
Northwestern group	954	915	1,170	1,057	834
Southwestern group	183	224	240	243	206
Eastern group	227	266	262	201	203

The degree of progress in localization and concentration in the flour industry within any given period can not be exactly established because there is no precise information in regard to the quantity of wheat ground and flour produced in the country. The consumption of wheat in flour mills was apparently about 4 million bushels less and the output of flour about 1 million barrels less in 1917-18 than in 1913-14. (See pp. 91–97.)

Comparing the figures in Table 16 with those in the preceding paragraph, it seems clear that mills represented by the Southwestern group continued to increase their share in the country's wheat-flour business from 1913-14 to 1917-18. For while, according to estimate, all mills ground 4 million bushels less wheat and made 1 million barrels less flour in the last year of the five than in the first, the Southwestern group ground 3 million bushels more wheat, and had increased its output of flour accordingly. Furthermore, this group did not lose business in 1916-17 as the other two groups did. In fact, its output both of flour and feed increased slightly in spite of a decrease of a quarter of a million bushels in the quantity of wheat ground. This peculiar result is in part explained by the difference in the moisture content of the two crops. Tests made by the Federal Grain Supervision Section of the Bureau of Markets show a moisture content of 13.9 per cent for samples of hard red winter wheat arriving in Kansas City from the crop of 1915 and of only 11.6 per cent for samples taken from the crop of 1916 (also see Exhibit VI).

When the other groups are considered, the results are strikingly different. Consumption of wheat by the Eastern group fell off about 2½ million bushels; by the Northwestern group about 18½ millions. But the data just referred to indicate that consumption for the entire country decreased only 4 million bushels. It follows that since wheat used by the 37 companies fell off 18 million bushels,

according to Table 16, smaller mills not included in the 37 must have increased their consumption of wheat about 14 million bushels. These figures might be accepted as indicating a considerable decrease in relative importance of the Northwestern and Eastern groups. This indication seems much stronger, however, for the former than for the latter.

The figures for 1917-18, however, do not establish a declining tendency in the business of the Northwestern group any more than the figures for 1915-16 establish the opposite. Estimates referred to before (see Table 29) show an increase in wheat consumption by all mills in 1915-16 over the previous year of about 8 per cent, but Table 16 shows that wheat consumption by the Northwestern group increased about 25 per cent that year. As has been seen in the preceding paragraph, however, this apparent tendency of the Northwestern group to increase its proportion of the total flour business was entirely reversed within two years. Its remarkable gain in 1915-16 was undoubtedly due to the fact that 1915 was a year in which the hard spring wheat harvest was most satisfactory in quality as well as quantity. On the other hand, winter wheat of the 1915 crop was quite generally inferior in quality and light in weight. (See Exhibit VI.)

Attention should be called to the probable effect of Government appeals for greater production on the output of the smaller mills in 1917-18. Account should also be taken of the fact that the quantity of wheat ground by the large mills could not exceed the limit fixed by Food Administration restrictions. Furthermore, it is said that it was partly in response to appeals from the Food Administration that the Northwestern group produced the 4½ million barrels of wheat-flour substitutes shown in Table 16. In preceding years their production of these substitutes had been negligible, or of such small significance that it has been included in the wheat-flour figures in the tabulations of the Commission. It is evident that the conversion of wheat-flour machinery to the grinding of these substitutes must have had some part in the decreased production of flour by these mills in 1917-18. Special Government restrictions on the movement and consumption of wheat were also probably contributing factors. In February, 1918, the Minneapolis office of the Milling Division issued an order that all mills which had ground 75 per cent of 90 per cent of their average yearly grind were to discontinue operations immediately. Mills that were grinding for the Army and Navy and those that were grinding local wagon wheat for the domestic trade were excepted from this order. It is probable that this regulation tended to somewhat increase the relative output of the smaller mills.

Table 16 shows that for the five years taken together sales of flour exceeded the flour produced. These mills have a reported capacity of about 65 million barrels annually, and have never produced 45 million barrels, yet they are buying more or less flour every year. In no year of the five, however, did such purchases amount to 1½ per cent of the sales of the 37 companies. While no special investigation was made of this practice, it is apparently in large part the result of temporary shutdowns of different plants, or of occasional increased demand on the part of customers. For example, much of the large quantity purchased in 1913-14 was due to the burning of a mill. It might be noted, however, that the other years in which sales exceeded production were all high wheat cost years. This suggests the possibility that in such years cost of production may have been less for local mills favorably situated as to wheat supply than for the large mills.

Section 6. Investment, earnings, and distribution of earnings.

The investment as revised by the Commission was computed by adding to the amount of common and preferred stock outstanding, outstanding bonds, accumulated undivided profits and the estimated value of plants rented by the 37 companies. The following table shows changes made by the Commission in the investment as found in the original accounts at the beginning and at the end of the five-year period. These changes include deductions under the items, "Good will," "Outside investments," and "Depreciation"; additions under the items, "Federal tax reserves," "Other reserves," and "Estimated value of rented plants"; and miscellaneous changes in inventories and other accounts.

TABLE 17.—*Deductions from and additions to the investment as shown in the original company accounts.*

	First of year 1913–14.	End of year 1917–18.
Investment shown by company accounts	$46,996,419.60	$69,701,369.46
Deductions from investment originally shown:		
Good will, etc.	4,948,206.23	4,661,475.00
Outside investments	2,467,925.14	6,318,167.36
Depreciation (increases in)	683,662.39	5,123,707.76
Inventory adjustments, etc. (net)		814,024.63
Total deductions	8,099,793.76	16,917,374.75
Additions to investment originally shown:		
Federal tax reserves [1]		6,744,665.71
Other reserves [1]	554,512.57	4,805,525.53
Estimated value of rented plants	3,854,096.00	5,194,419.00
Inventory adjustments, etc. (net)	155,545.32	
Total additions	4,564,153.89	16,744,610.24
Investment as revised by the Commission	43,460,779.73	69,528,604.95

[1] Considered as appropriated surplus.

The table shows practically $5,000,000 deducted under the head of good will, trade-marks, and other intangible assets. The leading millers of the country do not set up intangible assets in their accounts. The good will shown above was found in the accounts of four mills, three of minor importance. Nearly three-fourths of the whole amount was found in the accounts of the other mill which made no pretense that it represented actual investment. The securities issued in exchange for it are labeled to that effect. This deduction on account of good will was made because the purpose is to establish the investment necessary for the production and distribution of flour.

The purpose of deducting outside investments, the value of which increased from 2½ to 6½ million dollars during the five years, is evident. The inquiry is concerned only with the milling business and, consequently, an investment that is partly milling and partly something else can not be used satisfactorily. It is worth noting that the increase of about $3,850,000 was in large part invested in United States bonds.

The failure by the millers to establish reasonable depreciation reserves has already been noted. Such information as was available in regard to the plant and equipment of the 37 companies warranted an increase in depreciation reserves of considerably over $500,000 at the beginning of the period. A more complete investigation might have justified a still larger increase. During the five years the Commission's changes increased the total depreciation reserves set up by the companies practically $4,500,000, resulting in a deduction of $5,123,707.76 from the investment shown by the millers' own accounts at the end of the period.

The prevalent practice among the large mills of throwing profits and losses from one year to another by setting up estimated loss or gain on unfilled orders and open trades in their profit and loss accounts, and taking inventories at market value instead of average cost, has already been referred to. (See p. 55.) These incorrect statements of results obtained from actual receipts and expenditures within a given year have been corrected so far as possible. The changes in the accounts made necessary by this practice, shown in the table as "inventory adjustments," resulted in an addition of $155,545.32 to the investment at the beginning of the five-year period and a subtraction of $814,024.63 at its close.

Altogether the Commission's deductions from the investment shown by the mill accounts at the first of the year 1913–14 amounted to over 8 million dollars and to 17 million dollars at the end of 1917–18. Additions to the company investment at the end of the period, however, practically balanced deductions, so that total investment, including good will as shown in the original accounts, is only $175,000

more than the milling investment of the 37 companies as determined by the Commission.

The additions to investment include the capitalized value of rented mills, reserves which, set aside for provisional or contingent expenditures, still continue to be a part of surplus until the expenditures are actually made[35] and certain adjustments in inventories. Their rented mills are unquestionably as essential to the production of the flour sold by these companies as are their own mills, and the value of such mills necessarily constitutes a part of the capital employed in the business.

The increase in the amount of reserves disallowed by the Commission from half a million dollars at the beginning of the period to 11½ million dollars at its close is a more complex matter. Here again, as in the case of good will, the Commission has no controversy with the conservative business man in regard to the wisdom of establishing reasonable surplus reserves against future contingent expenditures, losses through a declining market, or through any unlooked-for change in factors affecting the financial outcome of his business. For example, the accumulation of funds for the payment of cumulative dividends on preferred stock is certainly a prudent if not at times a necessary operation, but these funds remain in the business and should be continued in the accounts as a part of the surplus until payment of the dividends actually occurs. Consequently the Commission has thrown reserves of this character back into surplus as accumulated profits. Other reserves treated in the same way are those for contingent losses that may never occur, and for prospective enterprises that may never be undertaken. The reserves of this character thrown back into surplus amounted to $554,512.57 at the beginning of the period and to $4,805,525.53 at its end. In other words, while the Commission set up about $4,500,000 in reserves to provide adequately against depreciation in plant and equipment, it also threw back into surplus a slightly larger amount in reserves that could not be justified. It will be seen from the exact figures that the net effect of the Commission's revision of these items was a decrease of about $300,000 in the investment shown at the end of 1917–18 in the original accounts.

In addition to the items discussed in the paragraph above, many of the companies have in recent years set up reserves for the payment of Federal taxes. These reserves may not have exceeded the amount of taxes that were paid to the Federal Government during the following year; nevertheless, if these deductions from investment had been allowed to stand, the Commission's revised investment would

[35] Reserves not returned to surplus for addition to investment were depreciation, bad debts, and others intended to offset an actual decrease in assets.

not have covered millions of earnings which were actually retained by the mills and used in their business.

The following table shows for the 37 companies, and also for the three groups, the revised investment at the beginning of each year, 1913–14 to 1917–18; changes in this investment due to operations outside the milling business during each year; and the net increase in the investment due to mill earnings less distributions and other justifiable charges against such earnings:

TABLE 18.—*Revised investment in the milling business at the beginning and end of each year, together with adjustments because of transactions not pertaining to the milling business, and additions through the mill earnings of the year, less distributions, by years, 1913–14 to 1917–18.*

[Figures in italics are to be deducted.]

	1913–14	1914–15	1915–16	1916–17	1917–18
37 COMPANIES.					
Investment, beginning of year	$43,460,779.73	$43,915,042.50	$47,746,462.48	$48,750,825.25	$62,015,089.70
Surplus adjustments [1]	349,992.44	*145,692.59*	485,833.13	*529,994.46*	[4] *2,838,932.11*
New investment [2]	*299,424.98*	209,112.81	*626,363.50*	532,900.91	391,307.06
Mill earnings	5,512,163.40	7,974,986.14	6,338,651.23	20,517,569.45	22,440,858.36
Distributions from mill earnings [3]	*5,103,468.09*	*4,206,986.38*	*5,193,768.09*	*7,256,211.45*	*12,479,718.06*
Mill earnings retained in business	403,695.31	3,767,999.76	1,144,893.14	13,261,358.00	9,961,140.30
Investment, end of year	43,915,042.50	47,746,462.48	48,750,825.25	62,015,089.70	69,528,604.95
NORTHWESTERN GROUP.					
Investment, beginning of year	26,708,042.44	26,635,007.99	29,051,545.39	29,989,239.41	39,356,886.30
Surplus adjustments [1]	332,280.94	*200,847.20*	475,798.80	*480,518.43*	[4] *1,379,104.29*
New investment [2]	51,708.49	141,584.75	*262,683.62*	433,075.90	290,150.45
Mill earnings	3,679,019.16	5,401,004.41	4,647,172.56	15,212,647.98	13,518,744.14
Distributions from mill earnings [3]	*4,136,043.04*	*2,925,204.56*	*3,922,593.72*	*5,797,558.56*	*8,501,572.02*
Mill earnings retained in business	*477,023.88*	2,475,799.85	724,578.84	9,415,089.42	5,017,172.12
Investment, end of year	26,635,007.99	29,051,545.39	29,989,239.41	39,356,886.30	43,285,404.58
SOUTHWESTERN GROUP.					
Investment, beginning of year	6,178,379.31	6,408,499.82	7,500,325.65	8,114,277.78	10,473,558.69
Surplus adjustments [1]	*13,958.66*	25,211.62	40,787.61	*10,581.03*	[4] *472,307.42*
New investment [2]	*62,733.47*	153,428.06	102,155.12	139,825.01	287,856.61
Mill earnings	709,089.80	1,455,141.41	977,248.29	2,987,187.21	5,019,603.13
Distributions from mill earnings [3]	*397,477.22*	*541,955.26*	*506,338.89*	*757,150.28*	*2,192,946.59*
Mill earnings retained in business	311,612.58	913,186.15	471,009.40	2,230,036.93	2,826,656.54
Investment, end of year	6,408,499.82	7,500,325.65	8,114,277.78	10,473,558.69	13,115,464.42
EASTERN GROUP.					
Investment, beginning of year	10,574,157.98	10,871,534.69	11,194,591.44	10,647,308.06	12,184,644.71
Surplus adjustments [1]	30,670.10	29,942.99	*30,753.28*	*38,895.00*	[4] *937,220.40*
New investment [2]	*238,400.00*	*85,900.00*	*465,835.00*	*40,000.00*	*187,000.00*
Mill earnings	1,124,054.44	1,118,840.32	714,230.38	2,317,734.26	3,902,511.09
Distributions from mill earnings [3]	*574,947.83*	*739,826.56*	*764,925.48*	*701,502.61*	*1,785,199.45*
Mill earnings retained in business	549,106.61	379,013.76	*50,695.10*	1,616,231.65	2,117,311.64
Investment, end of year	10,871,534.69	11,194,591.44	10,647,308.06	12,184,644.71	13,127,735.95

[1] The net amount of charges and credits in the original accounts, arising from transactions that can not justifiably be considered as belonging to the milling business of the year.

[2] Net change through the sale and redemption of corporation securities, and the contributions and withdrawals of individual proprietors. The contributions and withdrawals were insignificant in amount.

[3] These distributions include dividends, board interest, Federal taxes, and rents. The amount shown in the table is a net figure obtained by deducting from the total of such distributions all income from outside sources.

[4] The increase shown is largely the result of the purchase of Government bonds.

Table 18 shows only the investment in the milling business of these concerns. This includes, of course, their investments in subsidiary enterprises, such as grain elevators operated primarily for the purpose of securing a reliable steady supply of a desired quality of wheat at the lowest possible cost, and branch houses maintained at a distance from the mill for the purpose of securing as satisfactory and as profitable a distribution of the mill products as is possible.

On the other hand, it does not include as milling investment a small part of the surplus of these concerns, which has been invested in the securities of other enterprises, Liberty bonds, etc. The amounts thus invested have been considered as incidentally held subject to conversion into cash and distribution in dividends at the pleasure of each concern, and, therefore, not really a part of the investment in the milling business itself.

Starting with $43,460,779.73 at the beginning of 1913–14, the 37 companies increased their investment to $69,528,604.95 at the end of 1917–18. In spite of this increase in investment, their sales had fallen off from 38,450,000 barrels of flour in the first year to 34,659,000 barrels in the last. As already noted, however, their production of rye, corn, and other cereal products had increased as much as their production of wheat flour had fallen off. (See p. 59.)

The net addition to their investment through sale and redemption of their own securities during the five years was only $200,000.[36] During the first three years, while as yet the war had apparently had but slight effect on the situation, they were able to increase investment out of earnings by $5,000,000 and at the same time make a net reduction of over $700,000 in their outstanding securities. During the two critical years of the war which followed, they retained in the business over $23,000,000 of earnings. In addition investment was increased by the sale of their own securities in excess of retirement to the amount of $900,000. This, however, was not for use in their milling business, for not only the $900,000 secured by selling their own securities but also some 2½ million dollars taken out of earnings were invested in Government bonds. This increase in their holdings of Federal securities was largely responsible for the deduction of $2,838,932.11 from investment in order to get the true milling investment at the end of the year 1917–18.

The mill earnings beginning with 5½ million dollars for the first year increased to over $22,000,000 (four times as much) in 1917–18. (See note p. 9.) According to the United States Census Bureau 1913-14 was not a good year in the milling business, but these mills, even in that year, earned over 12 per cent on their average investment. The $7,974,986.14 earned in 1914–15 was more than 15 per

[36] This does not, of course, include $3,900,000 transferred from surplus to capital stock through the distribution of stock in dividends, which added nothing to total investment.

cent on investment, but the abundant supply of flour in 1915–16 showed its natural consequence in the decreased earnings of that year, which were practically at the same rate as in 1913–14. To make clear the principal cause of the decreased earnings in 1915–16 it is only necessary to say that flour that sold for more than $7 in February, 1915, sold for less than $5 in four out of the twelve months of 1915-16.[37]

The mills went into the year 1916–17 with good supplies of low-cost goods in their inventories. As early as August, 1916, the known great decrease in the supply of wheat had caused the wholesale prices of flour to advance 40 to 50 per cent above the level in June, 1915.[37] This advance in prices did not halt appreciably, except for a short time near the close of the year 1916, when peace rumors were prevalent, until in May, 1917, when the prevailing price was from 190 to 200 per cent above that in the preceding June. Prices of wheat moved parallel to those of flour, but the holdover from the big crop of 1915 and other favorable circumstances enabled the 37 companies to make large increases in the margin between wheat cost and flour receipts per barrel.

The result of the milling situation briefly suggested in the preceding paragraph was a threefold increase in the profits realized in 1916–17 over those of the preceding year. Indeed the rate of return on investment was three times what it had been for the two years 1913–14 and 1915–16, in spite of the larger investment required by advancing prices and a considerable decrease in the volume of business.

Government intervention became imperative in 1917. Prices of wheat were stabilized and the profits of millers were to some extent standardized. Mills frequently made more than the standardized profits, however, in order to insure themselves against possible losses toward the end of the year. There was practically no limit to the profit on flour except the Government restrictions since substitutes such as corn meal and rye and barley flours were being forced upon the consumers, and the prices paid had little influence with purchasers if they could find anyone who would sell them wheat flour. Furthermore, the profit of $22,000,000 shown for 1917–18 does not fully represent the wider margin actually paid by the consumers who purchased flour in the commercial flour markets of the United States that year. It became plainly evident toward the close of the year that no reversal in general market conditions was possible. Consequently, shortly before the close of the period during which the standardized profit was in force, some of the mills, realizing that their average profits would otherwise exceed greatly the standard agreed upon, made sales direct to the Government at less than cost. Circumstances have not permitted the Commission to investigate the full effect of this policy.

[37] The Northwestern Miller, Oct. 1, 1919, p. 58.

It will be noted that the net increase in milling investment during the five years shown in Table 18 (see also Table 19, p. 69) was less than the amount shown under the item "Mill earnings retained in in the business." This is due to the fact that part of these earnings were used in the purchase of stock in outside enterprises, Government bonds, etc., the remainder representing the net addition to the investment as it stood at the beginning of the year 1913–14.

The revised investment at the beginning of 1913–14 and at the end of 1917–18 is shown below, together with the per cent of increase during the period:

	1913–14	1917–18	Increase.
			Per cent.
37 companies	$43,460,780	$69,528,605	60
Northwestern group	26,708,042	43,285,405	62
Southwestern group	6,178,579	13,115,464	112
Eastern group	10,574,158	13,127,736	24

These increases absorbed less than half of the mill earnings shown below, except in the case of the Southwestern group:

	Amount of earnings.	Per cent on original investment.	Average annual rate on investment.[1]
			Per cent.
37 companies	$62,784,228.58	144	22.5
Northwestern group	42,458,588.25	159	24.4
Southwestern group	11,148,269.84	180	23.5
Eastern group	9,177,370.49	87	15.8

[1] Mean between the investment at the beginning and end of the period. Rates computed as explained under Table 20 on page 72.

Payments out of these earnings to stockholders, bondholders, rented-mill owners, and on account to Federal taxes are shown below:

	Amount of distributions.	Per cent on original investment.	Average annual rate on investment.[1]
			Per cent.
37 companies	[2] $34,245,142.07	79	12.1
Northwestern group	25,282,971.90	95	14.4
Southwestern group	4,395,768.24	71	9.1
Eastern group	4,566,401.93	43	7.7

[1] Mean between the investment at the beginning and end of the period.
[2] Payments of Federal taxes included in these distributions amounted to $5,524,883.77.

In addition to these distributions nearly $4,000,000 of mill earnings were transferred to outside investments.

To get the full significance of the above tables, assume that a man had a million-dollar investment covering all forms of capital included

in the $43,460,780 investment of the 37 companies at the beginning of 1913–14, and a corresponding investment in the mills of the different groups. The table below shows the results that would have been realized on such investments during the five-year period:

	Original investment.	Earnings in five years.	Withdrawn during five years.[1]	Milling investment at end of period.
37 companies	$1,000,000	$1,440,000	$840,000	$1,600,000
Northwestern group	1,000,000	1,590,000	970,000	1,620,000
Southwestern group	1,000,000	1,800,000	680,000	2,120,000
Eastern group	1,000,000	870,000	630,000	1,240,000

[1] This includes a proportionate part of Federal tax payments and additions to outside investments.

For the purpose of more effective comparison the financial results obtained by the 37 companies during the five-year period are summarized below according to the original accounts and also according to the accounts as revised by the Commission:

TABLE 19.—*Comparison of the results of mill operation and of investment items as shown in the original accounts and in the Commission's revised statements.*

[Figures in italics are to be deducted.]

Financial results shown by original accounts:	
Investment,[1] beginning of 1913–14	$46,996,419.60
Net increase in securities outstanding	3,793,382.30
Outside income	1,720,492.88
Milling income	47,876,696.98
Total income	53,390,572.16
Dividends paid	*30,685,622.30*
Net increase in investment	22,704,949.86
Investment,[1] end of 1917–18	69,701,369.46
Financial results shown by revised accounts:	
Investment,[1] beginning of 1913–14	43,460,779.73
Adjustments	*2,678,793.59*
New investment	207,532.30
Mill earnings	62,784,228.58
Distribution from mill earnings	*34,245,142 07*
Mill earnings retained in business	28,539,086.51
Investment,[1] end of 1917–18	69,528,604.95

These tables are not easily comparable, as the purpose of the first is to show results for the entire business of the companies, and that of the second is to show results for their milling business only. For this reason the amount of outside income is shown in the upper part of the table and not in the lower. Furthermore, in the lower part of the table, in addition to excluding investment in outside securities from the revised investment, the Commission has included the estimated value of rented plants. (See p. 64.)

The difference between the item of "Net increase in securities outstanding" in the upper part of the table and the item "New investment" in the lower part is largely due to the exclusion of stock dividends from new investments. They constituted an addition to

[1] Includes stocks, bonds, and surplus.

stock outstanding and a corresponding deduction from surplus but added nothing to investment. The Commission includes in its new investments a $30,000 estimated increase in the value of rented plants during the five years, which was due to changes in the buildings themselves and not to reappraisals.

Receipts and expenditures not really a part of the milling business, which resulted in a net charge against income of about $2,700,000, are brought together under the item "Adjustments" in the lower part of the table. These adjustments include deductions from the investment as it stood (after revision) at the beginning of the period as follows: (1) About $3,850,000 paid out for outside investments (see p. 66); (2) about $150,000 in miscellaneous items which the Commission rejected as unwarranted charges against milling operations, and, therefore, deducted from investment just as regular dividends are deducted; and (3) about $200,000 added directly to investment in the original accounts by means of appraisals which were rejected by the Commission.

The adjustments also include direct additions to investment by the Commission, because of reserves taken out of investment as shown on the books, for a variety of contingencies such as those enumerated on page 64, amounting to about $1,500,000. Apparently these reserves had been set up without corresponding charges to operations, or to income, and since this prevented throwing them back into earnings, it was necessary to return them directly to investment. With complete records and an exhaustive investigation practically all of this $1,500,000 might have been shown to be a part of earnings, but the general results obtained from the inquiry would not be materially changed.

In the upper part of the table the original accounts show that the mill earnings of the 37 companies during the five years amounted to $47,876,696.98. In sharp contrast with this the lower part of the table shows mill earnings amounting to $62,784,228.58. On examination, however, this increase of $14,907,531.50, or over 30 per cent, is found to involve differences as to classification to a greater extent than questions as to the actual facts in the case.

In obtaining the statement of mill earnings found in the upper part of the table, $11,774,659.10 was deducted as a provision for Federal income and excess-profit taxes.

The directors of the 37 companies, whose accounts were used in the preparation of this table, did not look upon bondholders or owners of rented plants as investors in wheat-flour milling. As a natural consequence they added bond interest and, naturally, rent paid, to their other expenses. But, since in this report bonds outstanding and the estimated value of rented plants have been included in the investment accounts of the 37 companies, payments of bond interest

and rent necessarily become a part of the net income used in determining the rate of return on investment. The rents thus added to net income amounted to $3,589,089.31, and the bond interest to $1,416,114.36.

These three items—Federal taxes, rentals, and bond interest—amounted to $16,779,862.77 during the period covered by this table. Since the net difference between mill earnings in the two tables was only $14,900,000, it is evident that the other changes made by the Commission reduced the earnings shown by the companies' own accounts by about $1,900,000.

The more important changes made by the Commission that tended to reduce mill earnings were as follows:

Increase in depreciation	$3,235,778.38
Disallowing estimated profit on unfilled orders, etc	228,155.10
Reducing inventories taken at market price	741,414.85
Disallowing increases of investment by reappraisals	1,029,984.79
	5,235,333.12

On the other hand, the Commission threw back into earnings contingent reserves discussed on page 64 to the amount of $3,249,673.14 and disallowed small miscellaneous charges amounting to $113,330.31. The total of these two credit items, namely, $3,363,003.95, subtracted from the $5,200,000 in debit items listed above, approximate the $1,900,000 reduction in earnings referred to in the preceding paragraph.

While the upper part of the table on page 69 gives the amount of dividends paid by the 37 companies as $30,685,600, the lower part of the table shows a distribution of mill earnings amounting to $34,245,142.07. Stock dividends amounting to $3,900,000 included in the $30,685,600 were excluded from the Commission's distribution figures, because the earnings were not actually distributed but were retained in the business. It was assumed further that the $1,700,000 income from outside investment was all distributed to the stockholders as a part of dividends paid, with the consequence that that amount was necessarily deducted from actual cash distributions in order to obtain the distribution from mill earnings. On the other hand, as already noted, the $5,500,000 paid out as Federal taxes was included in distributions from net income. Bond interest amounting to $1,400,000 and rent amounting to $2,300,000 were treated in the same way. These three items added $9,200,000 to distribution while the deductions noted above amounted to $5,600,000, giving a net difference of $3,600,000 between dividends as shown in the original accounts and distributions from mill earnings according to the revised figures.

That the original accounts should show only $22,704,949.86 added to total investment, while the Commission's revisions show that

$28,539,086.51 of mill earnings were retained in the milling business is the net result of the foregoing changes in the operating and investment accounts.

Table 18 shows new investments during the five years for the Northwestern and also for the Southwestern group. In neither case, however, was the amount of these new investments nearly so large as the amount of money put into outside enterprises. In the case of the Eastern group, redemption of company securities exceeded their sale in every year of the five.

Comparison between the earnings of the different groups shows that the earnings of the Northwestern group varied from about twice to about three times those of the other two groups combined, except in 1917–18 when the amount was only one and one-half times the aggregate for the other groups.

Section 7. Rate of return on investment.

The following table shows the average investment and the rate of return realized on it for the 37 companies and each of the groups by years from 1913–14 to 1917–18:

TABLE 20.—*Investment and rate of return on investment, by groups and by years, 1913-14 to 1917-18.*

Year.	37 companies.		Northwestern group.		Southwestern group.		Eastern group.	
	Investment.	Per cent of profit.	Investment.	Per cent of profit.	Investment.	Per cent of profit.	Investment.	Per cent of profit.
1913–14	$43,687,911.12	12.6	$26,671,525.22	13.8	$6,293,539.56	11.3	$10,722,846.34	10.5
1914–15	45,830,752.49	17.2	27,843,276.69	19.4	6,954,412.73	20.9	11,033,063.07	9.1
1915–16	48,248,643.87	13.1	29,520,392.40	15.7	7,807,301.72	12.5	10,920,949.75	6.5
1916–17	55,382,957.48	38.4	34,673,062.86	44.7	9,293,918.23	34.2	11,415,976.39	22.8
1917–18	65,771,847.33	34.1	41,321,145.44	32.7	11,794,511.56	42.6	12,656,190.33	30.8

The average investment shown in Table 20 is the mean between the investment at the beginning and at the end of the year. The method of determining these investments has been discussed in the preceding section.

The amounts of profit used in computing the respective rates shown in Table 20 are the corresponding mill earnings shown in Table 18, except that for a few companies, where Table 18 shows net earnings for more or less than the year, the accounts have been put on an annual basis. They include all profits incidental to the business of making and distributing wheat flour as carried on by the 37 companies. For example, any profits or losses made on barley or rye flour in 1917–18 were included with the profits on wheat flour in computing the rates shown in the table. Two reasons made this method of treating profits advisable. First, it appeared probable that most of the business in coarse-grain products used as substitutes

for wheat flour was of a temporary character and that the mills would largely discontinue it on the return of normal conditions. Second, it was carried on to a large extent with the same plant and equipment that had previously been used in the wheat-flour business, and the records furnished no really satisfactory means of dividing investment or operating accounts between the wheat-flour business and the business in substitutes.[30]

As already noted, according to the Bureau of the Census, 1913–14 was not a good year in the milling business. Such general information as the Commission had obtained concerning milling conditions for several years prior to 1913–14 as well as definite information obtained from a number of mills in regard to conditions in 1912–13 indicates that the period of relative depression in the milling industry covered a number of years prior to 1913–14. Nevertheless, the 37 companies were doing a very satisfactory business in 1913–14 and the Northwestern group had apparently been even more prosperous the year before.

The table shows that in round numbers the aggregate average investment of the 37 companies in 1913–14 amounted to $44,000,000 and that in 1917–18 it had increased to $66,000,000. This increase of 50 per cent is, of course, somewhat less than the increase of investment from the beginning of the year 1913–14 to the end of the year 1917–18, which has already been discussed in section 6.

In spite of the reputed poor business conditions for the milling industry in 1913–14 the 37 companies realized a profit of 12.6 per cent on their investment. Under the stimulus to business due to the opening of the war in 1914–15, which was accompanied by an export of wheat and flour which advanced prices rapidly, profits in that year were increased to 17.2 per cent. In 1915–16 with an unparalleled supply of wheat and flour in the United States the demand from Europe also fell off very greatly. Apparently, in consequence of this change from the situation in 1914–15, the average profit of the 37 companies dropped to 13.1 per cent. These conditions were all reversed before the end of 1916–17. Indeed, throughout most of the latter half of that year there appeared to be no limit on the price that purchasers were willing to pay for flour. The natural result was an increase in the profit of the 37 companies during 1916–17 to 38.4 per cent.

Conditions of scarcity continued throughout 1917–18. The stabilization of the price of wheat through Government regulation and the agreement in regard to millers' margin of profit had their effect on the situation. Nevertheless, Table 20 shows that the 37 companies realized a profit of 34.1 per cent in that year. It has

[30] See p. 79 for approximate segregation of coarse-grain operating receipts and expenditures in 1917–18.

already been noted that this rate of return does not fully represent the profit realized on their sales to the public.

The average investment used by the Northwestern group amounted to $26,700,000 in 1913–14 and increased to $41,300,000 in 1917–18. In other words, the investment of the Northwestern group constituted over 60 per cent of the total investment of the 37 companies. During the five years it increased slightly more than 50 per cent while the investment of the Southwestern group almost doubled, and that of the Eastern group increased less than 20 per cent.

In 1913–14 the Northwestern group realized a profit of 13.8 per cent on its average investment; in 1914–15, 19.4 per cent. Two years later in 1916–17 its profit was 44.7 per cent, over three times the rate in 1913–14 and considerably over twice the rate in 1914–15. In 1915–16 the profit of this group had decreased to 15.7 per cent, but this decrease had been accompanied by an increase in its sales from 25,090,000 barrels of flour to 30,364,000 barrels. This large increase in the sales of the Northwestern group was made during a year in which the Southwestern group increased its sales less than 5 per cent, and the Eastern group actually lost business. Again, in 1917–18, the profit of the Northwestern group decreased—dropping back to 32.7 per cent. During the two high-profit years the sales of the group averaged only about 24 million barrels annually.

The average investment of the Southewstern group increased from $6,300,000 in 1913–14 to $11,800,000 in 1917–18. Earnings of this group were at the rate of 11.3 per cent in 1913–14, but increased under the change in conditions because of the European war to 20.9 per cent in 1914–15. It will be noted that the increase in rate of return on investment was somewhat larger for the Southwestern group in this year than for the Northwestern. A probable explanation for this difference is found in the fact that the hard spring wheat crop of 1914 fell off sharply both in quantity and quality. (See Exhibit VI.) In 1915–16 the rate of profit realized for the Southwestern group dropped to 12.5 per cent—that is, conditions for the two groups reversed themselves. The decrease in profit for the Southwestern in 1915–16 being considerably more than for the Northwestern. The greater relative prosperity of the Northwestern group in 1915–16 was without doubt due to the large crop of excellent hard spring wheat. Profits of the Southwestern group may have been affected, however, by the poor quality and excess moisture content of the winter wheat crop raised in 1915.

The profits of the Southwestern group in 1916–17 show the effect of the great scarcity of flour and the heavy European demand for it in that year—the rate of return realized by the group increasing to 34.2 per cent. This was an advance of 175 per cent over the 12.5 per cent realized in 1915–16. In spite of the very great increase in

its investment, the Southwestern group was able to increase the rate of return realized on it to 42.6 per cent in 1917–18.

It will be noted that the profit of the Southwestern group in 1917–18 (42.6 per cent) was practically 10 per cent in excess of the 32.7 per cent shown for the Northwestern group in the same year. As a matter of fact, it is not positively established that the Southwestern group has sold flour to the trade at a higher profit than that of the Northwestern group. Two causes were responsible for the difference shown in the table. The Northwestern group sold a larger quantity of flour to the Government below cost toward the close of 1917–18 than the Southwestern. Furthermore, the mill year of the Northwestern group runs through July and August, while that of the Southwestern ends in June. As a result of this difference in the years, the business of the Northwestern group in 1916–17 extended two months further than that of the Southwestern into the high-price period resulting from the wheat and flour panic of the spring of 1917. These two profitable months were, of course, included in the Southwestern's mill year, 1917–18, and unquestionably had their effect on the high rate of profit realized by that group. If the two years, 1916–17 and 1917–18, are thrown together, this peculiar effect of the difference in the mill years of the two groups is neutralized. Consequently a simple average of their rates of profit for the two years gives approximately the same figure.

Rates of profits realized by the Eastern group during the five-year period are strikingly in contrast with those realized by the other two groups. As might be expected from the lower rate of return, the investment shows no such increase for this group as for the other two. In 1913–14 it amounted to $10,700,000, and even under the extraordinary stimulus of war conditions it increased by less than $2,000,000 during this period.

Taking into account all information available, it appears quite probable that the year 1913–14 was a comparatively profitable year for the Eastern group, although the rate of return on its investment for that year, shown in the table (p. 72) was only 10.5 per cent. Under the stimulus of an increased supply of wheat through the eastern part of the country, this group increased its sales over 15 per cent, but the rate of profit, for causes which are not apparent, fell to 9.1 per cent in 1914–15 and even lower in the succeeding year. The rate realized in 1916–17 was 22.8 per cent or but little over half that realized by the Northwestern group. In 1917–18 the effect of an apparently unlimited demand for flour at any price resulted in an advance of the rate for the Eastern group to 30.8 per cent.

Section 8. Sales and profit on sales.

The following table shows the amount of flour sales and the rate of profit on such sales for the 37 companies and also for each group, year by year, during the five-year period covered by this report:

TABLE 21.—*Sales and per cent of profit on sales, by groups and by years, 1913–14 to 1917–18.*

Year.	37 companies.		Northwestern group.		Southwestern group.		Eastern group.	
	Flour sales.	Per cent of profit.	Flour sales.	Per cent of profit.	Flour sales.	Per cent of profit.	Flour sales.	Per cent of profit.
1913–14.....	$159,656,875.41	3.4	$112,152,428.59	3.3	$19,987,920.76	3.5	$27,516,526.06	3.9
1914–15.....	212,058,742.22	3.7	142,287,338.55	3.8	29,608,088.32	4.9	40,163,315.35	2.5
1915–16.....	227,969,626.22	2.7	157,638,606.32	2.9	30,922,055.56	3.2	39,408,964.34	1.6
1916–17.....	314,316,579.54	6.5	220,611,222.52	6.9	48,147,980.25	6.1	45,557,376.77	4.9
1917–18.....	354,192,286.93	5.3	232,622,282.35	4.6	59,639,224.88	7.8	61,930,779.70	5.6

There has been no investigation of the flour-milling industry of the United States sufficiently extensive to establish a typical satisfactory rate of profit on sales for the industry as a whole. The great excess of flour-making capacity over flour consumption, the surplus supply of wheat and also of flour, the relative simplicity of flour production, and the small exports of wheat and flour in some recent years (notably in the fiscal year 1905, see p. 12) all indicate that wheat-flour milling under normal conditions would not be expected to realize as large profits, either on sales or investment, as are realized by those industries in which demand appears to be expanding at a much more rapid rate than population. Table 21 shows that during the first three years covered, the average profit on sales was less than 3.5 per cent. Nevertheless, according to Table 20, the average investment for these companies increased from $43,687,911.12 in 1913–14 to $48,248,643.87 in 1915–16. This showing appears to indicate that favorably situated mills will prosper on a profit of less than 4 per cent on sales even when the price of flour is at a fairly low level.

The increase in prices during the five years covered by the report was such that the receipts from sales of 38,450,000 barrels in 1913–14 amounted to only $159,656,875.41, while receipts from sales of only 34,659,000 barrels in 1917–18 amounted to $354,192,286.93. In spite of an increase of 90 per cent in the price at which flour was sold in the last two years of the five, the 37 companies advanced their average rate of profit on sales to nearly 6 per cent.

The rate of profit realized on the sales by the 37 companies in 1913–14 was 3.4 per cent. With advancing prices in 1914–15, due to increased demand from Europe on account of the war, the rate increased to 3.7 per cent. In 1915–16 the European countries were apparently able to supply their demands at lower prices from other

countries. As a consequence the average price realized by the 37 companies fell off and the rate of profit on sales decreased to 2.7 per cent. With the complete change in condition in 1916–17 (referred to in preceding section) the profit on sales advanced to 6.5 per cent, but under Government regulations in the following year was brought back to 5.3 per cent.

The rate of profit on sales for the Northwestern group fell below 3 per cent in only one year of the five. That was the year 1915–16, when it was 2.9 per cent. In that year this group realized practically 16 per cent profit on its investment. In 1916–17 the rate of profit on sales for this group was 6.9 per cent, or considerably over twice as much. The rate of 4.6 per cent shown for 1917–18 would have been higher if sales had not been made to the Government at less than costs.

The amount of sales by the Southwestern group in the last year of the period was practically three times that in the first year. In no year of the five did its rate of profit fall to 3 per cent, although in 1915–16, when competition with the Northwestern group was exceptionally strong and the wheat supply of the Southwestern group was defective in quality, the rate of profit realized on its sales fell to 3.2 per cent. In spite of the fact that its mill year 1916–17 did not include the very high-price months of July and August, 1917, the Southwestern group realized a profit on sales of 6.1 per cent. This increase of between 50 and 60 per cent in the amount of sales and of nearly 100 per cent in the rate of profit on sales resulted in the advance of 175 per cent in the rate of return on investment already noted. (See p. 74.)

The effect of the flour and wheat panic in the spring of 1917 is evident in the profits of the Southwestern group in 1917-18. The price at which its flour was sold increased from $7.76 to $10.44 per barrel. Consequently, in spite of a decrease in the number of barrels sold from 6,200,000 in 1916–17 to 5,700,000 in 1917–18, its sales advanced to practically $60,000,000 and the profit on sales to practically 8 per cent. This meant a profit of over $5,000,000, or 43 per cent, on an investment of $11,800,000.

The showing for the Eastern group is quite different. Instead of a 200 per cent increase in sales, Table 21 shows for that group an increase of about 125 per cent, from $27,500,000 to $61,900,000. In spite of this relatively slow growth in sales, the rate of profit realized, 3.9 per cent in 1913–14 and 5.6 per cent in 1917–18, showed no such advance as was shown for the Southwestern group. A decrease in sales for this group in 1915–16 was accompanied by a decrease in the rate of profit on sales, with the result, already noted, that the group made only 6.5 per cent on its investment in that year.

Section 9. Average investment, receipts, cost plus interest, and profit per barrel of flour.

AVERAGE PER BARREL FIGURES FOR THE 37 COMPANIES.—The following table shows the average investment, receipts, cost plus interest, and profit per barrel of flour for the 37 companies.

TABLE 22.—*Average investment, receipts, cost plus interest, and profit per barrel of flour sold of the 37 companies by years, 1913–14 to 1917–18.*

	1913–14	1914–15	1915–16	1916–17	1917–18
Investment per barrel	$1.14	$1.21	$1.11	$1.45	$1.90
Receipts per barrel	4.15	5.55	5.25	8.55	10.22
Cost plus interest per barrel	4.01	5.34	5.11	8.00	9.57
Profit less interest per barrel	.14	.21	.14	.55	.65
RELATIVE INCREASE OR DECREASE.					
Investment per barrel	100	103	97	127	167
Receipts per barrel	100	134	127	206	246
Cost plus interest per barrel	100	133	127	200	239
Profit less interest per barrel	100	150	100	393	464

The investment figures for the 37 companies shown in Table 22 were obtained by dividing the total investment in their milling business by the number of barrels of wheat flour sold. These figures include the capital used in miscellaneous milling operations. This method of computing the investment per barrel was entirely satisfactory prior to 1917–18, because sales of other cereal products were so small that including them with the flour sales made no change in the average figure per barrel. It was impossible to continue this method of computing average receipts per barrel after the great increase in the output of coarse-grain products in 1917–18, as it would have resulted in considerable changes from the figures obtained by using wheat-flour sales alone. Receipts from sales of flour were therefore separated from the receipts from sales of other cereal products. This would have made a corresponding segregation of the investment used in that part of the business in 1917–18 desirable, but it was found to be impracticable.

In order to obtain a cost and profit per barrel comparable with the investment per barrel shown in Table 22, miscellaneous milling profits were deducted from the cost of flour and thus added to profit. In this way a profit of 65 cents per barrel of wheat flour sold was obtained for comparison with the investment of $1.90 per barrel. This 65-cent profit was not realized on the average receipts of $10.22 per barrel of flour, which include no receipts from coarse-grain products.

To obtain an approximate cost and profit per barrel comparable with the $10.22 receipts in 1917–18 and with the costs and profits in other years, receipts and expenditures have been divided as fairly as possible between wheat flour and miscellaneous milling operations.

Although the results are not entirely satisfactory, it is probable that when the operations of all these companies are combined the figures obtained are approximately accurate. This segregation of the accounts shows an approximate profit on miscellaneous milling in 1917–18 of 11 cents per barrel of wheat flour sold. As the item of cost plus interest shown in Table 22 was obtained by deducting this profit on miscellaneous milling from the cost charged directly to flour, it follows that when it is not deducted, cost plus interest per barrel in 1917–18 is increased from $9.57 to $9.68, and the profit is decreased from 65 cents to 54 cents.

The item of interest which is added to cost in the table is made up of interest on short-time loans and some discounts, less credits of a similar character. The information available in regard to these transactions is not sufficient to determine even approximately the average amount of short-time funds employed in the business. Since it was impossible to increase investment by adding short-time funds used, adding interest paid on such funds to profits could not be justified. Consequently this net interest charge was added to cost in ascertaining the profit per barrel, shown in Table 22.

This interest account increased from 2 and 3 cents in the earlier years to 5 cents in 1916–17. This makes it practically certain that the mills were using considerably larger amounts of short-time loans in that year. It is also probable that the decrease in interest to 4 cents per barrel in 1917–18 indicates that they were borrowing less money than the year before. This difference may, however, have been largely due to higher rates of interest in 1916–17. It was not feasible to obtain sufficient information on this subject to answer this and similar questions.

As already noted, some sales of coarse grain products were included with the flour sales prior to 1917–18. Furthermore, the flour accounts show minor debits and credits aside from actual receipts from flour. Nevertheless, the receipts per barrel shown in Table 22 represent with a fair degree of accuracy the fluctuations in the actual price of wheat flour sold by the 37 companies.

Table 22 shows that the 37 companies increased their investment per barrel of flour 67 per cent during the five years, from $1.14 in 1913–14 to $1.90 in 1917–18. During the first three years there was no material change. Indeed, in 1915–16 the average investment of the 37 companies was 3 per cent less than it had been in the year 1913–14. A marked change during 1916–17, the third year of the war, increased the investment 30 per cent, from $1.11 to $1.45 per barrel.

This increase of 34 cents was very largely due to the higher prices paid for wheat in the last half of 1916–17 and the resultant higher value of flour and wheat held in stock at the close of that year. In

July and August, 1916, prices were not appreciably higher than the average during the first three years covered by the table, but the effect of the wheat and flour panic of the spring of 1917 was to advance these prices to the highest point known in many years. In fact, prices at the close of the year 1916–17 were considerably above those maintained during the year 1917–18, although the investment shown for 1916–17, obtained, as already noted, by averaging the investment at the beginning and end of the year, is 45 cents less than the investment in 1917–18.

The prices of wheat and flour during 1917–18 were fairly well stabilized by Government regulation. The investment of $1.90 per barrel shown for that year is, therefore, much more typical of the investment throughout the year than the average of $1.45 shown for 1916–17. It should be noted, however, that the increase in investment per barrel in 1916–17 and 1917–18 was largely due to the decrease in number of barrels of flour sold, as compared with 1915–16 (see Table 16), and to some extent also to the necessity of making certain changes in the equipment of the mills because of the greatly increased production of coarse grain products in 1917–18. (See p. 61.)

Compilation of an entirely satisfactory statement of the increase in prices of wheat flour from 1913–14 to 1917–18 was an impossibility. The sales accounts which were used showed aggregate amounts of flour sales, which included minor credits and charges, the net amounts of which could not be determined. Such credits and charges were, therefore, necessarily included in the net receipts for flour, used in compiling Table 24. Nevertheless, the net receipts so compiled show with approximate accuracy the actual fluctuations in the price of flour sold by the 37 companies.

Table 22 shows an advance in average receipts per barrel from $4.15 in 1913–14 to $10.22 in 1917–18. The price level for the first two years of the war was practically 30 per cent above the 1913–14 level. The high prices in the spring of 1917 advanced the 1916–17 average to $8.55—106 per cent above the 1913–14 level. In 1917–18, practically the last year of the war, flour prices, as represented by sales of these companies, had advanced to 146 per cent above the prewar level.

Attention has already been called (see p. 42) to the fact that in the years 1911–14 the prices of flour were at a relatively low level. Certain factors that tended to hold the prices at this low level in 1913–14 are of interest in connection with the advance in prices during the war. The Food Administration's compilation of available statistics shows that the supply of wheat in the United States during the mill year 1913–14 was probably larger than it had ever been before. In addition to the large yield of wheat in 1913, its quality was excellent throughout the United States and its weight per bushel was excep-

tionally high. (See Exhibit VI.) Probably as a result of the effect of this large harvest upon the prices received by the farmers, they used, according to the best available information, some 200 per cent more wheat as feed for live stock in 1913–14 than they use under normal crop and market conditions.

The harvest of 1914, it is true, was larger than that of 1913, but the extraordinary exports to Europe on account of the war decreased the supply remaining for use in the United States. Furthermore, in the principal hard spring wheat States the crop was relatively small and the wheat of poor quality. These changes in the situation are reflected in the advance in the price of flour from $4.15 in 1913–14 to $5.55 in 1914–15.

This advance of 34 per cent in the price of flour from 1913–14 to 1914–15 was not fully maintained in the following year, when the average price was $5.25 per barrel, or only 27 per cent above the 1913–14 level. European demand for wheat from the United States was not maintained during 1915–16 at the high level of the previous year. Furthermore, the wheat crop in the Northwest was large and of high quality. In other sections of the country also the crop was larger than had ever been raised before, although of inferior quality, and carrying an extraordinarily heavy percentage of moisture. The result of these changes in the situation was a decrease of 30 cents per barrel in the average price for the 37 companies in 1915–16, which, however, was entirely due to a decrease of nearly 50 cents per barrel in the very large sales made by the Northwestern group in that year. (See p. 60.)

Reference has already been made to the great difference in the price of flour at the beginning and end of the year 1916–17. It follows that the average receipts of $8.55 per barrel are not representative of prices prevailing over any considerable part of the year. Nevertheless, they show that, taking the year together, the average cost of flour to the consumer was $3.30 per barrel more than it had been throughout the year 1915–16.

The discussion of cost per barrel has for the most part been deferred to section 10, where an analysis of total cost per barrel is presented. Of course, the fundamental factors influencing the fluctuations in cost were those which have already been referred to in the preceding discussion of the advance in prices.

Table 22 shows an increase in the profit realized by the 37 companies from 14 cents per barrel in 1913–14 to 65 cents in 1917–18, an advance of 364 per cent. It is necessary, however, to keep in mind the fact that approximately 11 cents of the 65 cents shown in the table was profit realized on sales of coarse grain products and that this total profit is used because that is the only way to show the cor-

rect relation of profit per barrel of flour to investment per barrel. If the 54 cents, approximate profit realized directly from the sales of flour alone, is substituted for the 65 cents shown in the table, the increase over 1913–14 will drop to less than 300 per cent—in fact, to less than the 293 per cent advance shown for 1916–17.

In spite of an increase of $1.10 in the receipts per barrel between 1913–14 and 1915–16 the profit realized, 14 cents per barrel, was exactly the same in both years. The year between, however, showed a profit of 21 cents, an increase of 50 per cent over 1913–14.

COMPARISON OF INCREASES IN THE INVESTMENT PER BARREL OF THE 37 COMPANIES AND OF THE DIFFERENT GROUPS.—The following table shows the investment per barrel of flour sold by the 37 companies for each of the years 1913–14 to 1917–18, with corresponding figures for the different groups, the per cent of increase for each group annually, and the percentage relations of investment for the different groups in each year.

TABLE 23.—*Comparison of increases in the investment per barrel of the 37 companies and of the different groups, by years, 1913–14 to 1917–18.*

	1913–14	1914–15	1915–16	1916–17	1917–18
37 companies	$1.14	$1.21	$1.11	$1.45	$1.90
Northwestern group	.98	1.11	.97	1.35	1.79
Southwestern group	1.26	1.18	1.27	1.47	2.06
Eastern group	1.74	1.57	1.58	1.85	2.17
RELATIVE PERCENTAGE INCREASE OR DECREASE.					
37 companies	100	106	97	127	167
Northwestern group	100	113	99	138	183
Southwestern group	100	94	100	117	163
Eastern group	100	90	91	106	125
PERCENTAGE RELATIONS OF GROUPS.					
37 companies	100	100	100	100	100
Northwestern group	86	92	87	93	94
Southwestern group	111	98	114	101	108
Eastern group	153	130	142	128	114

Table 23 makes it clear that the increase of 67 per cent in the investment of the 37 companies combined was the result of very different changes in the investment shown for the different groups. At the beginning of the period the investment of the Northwestern group was relatively very much smaller than that of either of the other groups. During the five years covered by the table, however, 81 cents was added to its investment, and only 43 cents to the investment of the Eastern group. The addition to the investment of the Southwestern group was 80 cents, or practically the same as that for the Northwestern.

Measured in percentages, the increase in the investment of the Northwestern group was 83 per cent, of the Southwestern 63 per cent, and of the Eastern only 25 per cent. The result of these changes was a gradual approach of the relative investment of the different groups to the same figure. The percentage relations in Table 23 show that while the investment of the Northwestern group was 14 per cent below the average investment for the entire group in 1913–14, it was only 6 per cent below the average in 1917-18. On the other hand, the investment for the Southwestern group, which was 11 per cent above the average in 1913–14, was only 8 per cent above the average in the later year. The approach of the investment for the Eastern group to the common average was even more striking, falling from an excess of 53 per cent in the first year of the period to only 14 per cent above the average in the last year.

The principal factor in this increasing similarity in the amount per barrel invested by the different groups was, without doubt, the advancing price of wheat and flour carried in inventories. The stabilization of wheat prices through Government restrictions in 1917–18 also contributed to this result. An indication of the effect of the advancing price of wheat is found in the fact that if a mill had carried the same quantity of wheat in stock in 1917–18 as it carried in 1913–14, according to the price figures in Table 14, it would have had two and one-half times as much money invested in wheat. The effect of the greater similarity in the cost of wheat for the different groups in 1917–18, which was undoubtedly to some extent due to Government stabilization, is indicated by a comparison of the figures for the Eastern and the Northwestern groups in 1913–14 and 1916–17. In the earlier year the investment per barrel of the Eastern group was 76 cents larger than that of the Northwestern; in the latter year only 50 cents larger. This change was evidently due in part to the fact that in 1913–14 the wheat used in a barrel of flour cost the Eastern group 38 cents more than it cost the Northwestern (see p. 118), but that in 1916–17 the cost of wheat to the Northwestern group was 39 cents per barrel more than to the Eastern.

A like contrary change in investment per barrel for the Northwestern group and the Southwestern group is found in the first two years of the period covered by the table, which shows an increase in the investment of the Northwestern from 98 cents per barrel to $1.11, and a decrease for the Southwestern group from $1.26 to $1.18. In the first year the cost of wheat per barrel for the two groups was the same, but in the second year, 1914–15, it was 62 cents more per barrel for the Northwestern than for the Southwestern. The result of these changes was that, measured by percentage relations, the investments per barrel for the two groups were nearer together than in any other year, that of the Northwestern having advanced to within

8 per cent of the average for the 37 companies, while that for the Southwestern had fallen to 2 per cent below the average, the amount of investment for the two groups being, as already noted, $1.11 and $1.18. The opposite trend of the investment per barrel of these two groups in 1915–16 is also explained in large part by the fact that in that year the cost of wheat had again become practically the same for the two groups. It is interesting to note also that the exceptionally high cost of wheat for the Northwestern group in 1916–17, 99 cents per barrel in excess of that for the Southwestern, again brought the per barrel investment of the two groups almost as near to each other as in 1914–15.

COMPARISON OF ADVANCES IN PRICES, OR RECEIPTS PER BARREL, OF THE 37 COMPANIES, AND OF THE DIFFERENT GROUPS.—The following table shows average receipts per barrel of flour sold for the 37 companies and for each of the different groups, by years, from 1913–14 to 1917–18, inclusive:

TABLE 24.—*Comparison of advances in prices, or receipts per barrel, of the 37 companies and of the different groups, by years, 1913–14 to 1917–18.*

	1913–14	1914–15	1915–16	1916–17	1917–18
37 companies	$4.15	$5.55	$5.25	$8.55	$10.22
Northwestern group	4.11	5.67	5.19	8.77	10.06
Southwestern group	4.00	5.04	5.04	7.76	10.44
Eastern group	4.46	5.53	5.68	8.39	10.62
RELATIVE PERCENTAGE INCREASE OR DECREASE.					
37 companies	100	134	127	206	246
Northwestern group	100	138	126	213	255
Southwestern group	100	126	126	194	261
Eastern group	100	124	127	188	238
PERCENTAGE RELATIONS BY GROUPS.					
37 companies	100	100	100	100	100
Northwestern group	99	102	99	103	98
Southwestern group	96	91	96	91	102
Eastern group	108	100	108	98	104

The advance in the average price of the 37 companies from $4.15 to $10.22, or 146 per cent,[39] has already been noted. This average advance of $6.07 per barrel was greater than the advance of $5.95 in the Northwest, but less than the advance in the Southwest or East. Nevertheless, because of the relatively low price of flour for the Northwestern group in 1913–14 (99 per cent of the average) and the relatively high price for the Eastern group (108 per cent of the average) the rate of advance for the Northwestern group was 155 per cent, while that for the Eastern was only 138 per cent.

[39] The flour sold under Government restrictions in 1917–18 was probably of poorer quality on an average than that sold in the other four years, and it also included sales to the Government at less than cost.

The tendency of prices received by the three groups to draw together is quite as noticeable as the corresponding tendency in regard to investment already discussed. This tendency is strikingly illustrated by the advance of the price in the Southwest from 15 cents below the average in 1913–14 to 22 cents above in 1917–18. Expressed in percentages, this means that in 1913–14 the Southwestern group received only 96 per cent of the average price and in 1917–18, 102 per cent. Also that prices for this group advanced 161 per cent, while, as just noted, prices farther east advanced only 138 per cent. This tendency of prices for all groups to approach each other was, of course, largely due to the causes responsible for the same tendency in the average investment per barrel for the different groups already discussed. It must be noted, furthermore, that if sales of the Northwestern group in the two high-price months of July and August, 1917, had been included in 1917–18 figures, as were those of the Southwestern, and if sales to the Government in 1918 below cost, which were according to available information much larger in the Northwest than in the Southwest, had been excluded in both cases, it is quite possible that the receipts per barrel for these two groups would have been practically the same instead of varying so much as the $10.06 for the Northwestern, and the $10.44 for the Southwestern, now shown in the table.

The predominating effect of the larger business of the Northwestern group on averages for the 37 companies is shown by the narrow range of the variations in its price per barrel from the average. In no year did it fall more than 2 per cent below the average, and only in 1916–17 was it as much as 3 per cent above the average.

The noticeable decrease in the relative price in the Southwestern group from 96 in 1913–14 to 91 in 1914–15, and in that of the Eastern from 108 in 1913–14 to 100 in 1914–15, were, however, largely due to the fact that the respective advances for those two groups in that year were only 26 and 24 per cent, while the corresponding advance for the Northwestern group was 38 per cent.

The advance in prices during the first three years covered by the table, 1913–14 to 1915–16, was practically the same—approximately 27 per cent. Consequently, the figures showing the relation of prices for the different groups are exactly the same for these years. With the renewal of a much stronger foreign demand in 1916–17, relative prices for the different groups went back to approximately the figures for 1914–15. It is not clear, however, that this change in the export situation was the exclusive, or even the most important, factor affecting the relatively greater advance for the Northwestern group, of prices in 1916–17 over those in 1915–16, expressed by 87 per cent of the 1913–14 price, while the corresponding figures for the Southwestern and Eastern groups were only 68 and 61 per cent respectively.

COMPARISON OF COST PLUS INTEREST PER BARREL OF THE 37 COMPANIES AND OF THE DIFFERENT GROUPS.—The following table shows the average cost per barrel of flour sold, together with the interest paid on short-time loans, for the 37 companies and also for each of the three groups, in each of the five years from 1913–14 to 1917–18, inclusive; also the rate of increase in cost, using cost in 1913–14 as a base, and percentage relations of cost for each company to cost for the 37 companies, by years.

TABLE 25.—*Comparison of cost plus interest per barrel of the 37 companies and the different groups, by years, 1913–14 to 1917–18.*

	1913–14	1914–15	1915–16	1916–17	1917–18
37 companies	$4.01	$5.34	$5.11	$8.00	$9.57
Northwestern group	3.98	5.46	5.04	8.17	9.48
Southwestern group	3.86	4.79	4.88	7.28	9.56
Eastern group	4.28	5.38	5.58	7.96	9.95
RELATIVE PERCENTAGE INCREASE OR DECREASE.					
37 companies	100	133	127	200	239
Northwestern group	100	137	127	205	238
Southwestern group	100	124	126	189	248
Eastern group	100	126	130	186	232
PERCENTAGE RELATIONS BY GROUPS.					
37 companies	100	100	100	100	100
Northwestern group	99	102	99	102	99
Southwestern group	96	90	95	91	100
Eastern group	107	101	109	100	104

As already noted, discussion of factors affecting cost fluctuations has been largely deferred until consideration of the analyses of the cost of making and selling a barrel of flour is taken up in section 10. Table 25 has been inserted at this point, however, in order to present the more important cost fluctuations, in relatively close connection with corresponding fluctuations in prices and profits.

A glance at the relative increases and decreases in Tables 24 and 25 makes it clear that average receipts advanced more rapidly, with relatively few exceptions, than costs of production and distribution. In 1915–16, a year of relatively low profits, the rate of advance over the 1913–14 level was practically the same for cost plus interest as for prices.

As was to have been expected, Table 25 shows the same drawing together of costs plus interest for the different groups that was shown for investments and prices in Tables 23 and 24.

As in the case of prices, the rate of increase shown in cost plus interest is greater for the Northwestern group than for the Eastern, although the amount of increase for the latter is $5.67 as compared with only $5.50 for the former. This, of course, is due to the fact that cost plus interest was 30 cents more for the Eastern group

in 1913–14 than for the Northwestern, their relative costs being expressed by 107 and 99 when cost plus interest for the 37 companies is represented by 100.

There was less difference in the rate of advance for the different groups in cost plus interest than in price. For the Southwestern group the rate of advance in price from 1913–14 to 1917–18 had been 23 per cent greater than for the Eastern, but its increase of 148 per cent in cost plus interest was only 16 points greater than the increase of 132 per cent for the Eastern. The result of this relatively more rapid advance of cost-plus interest was the much smaller rate of increase in profit per barrel for the Eastern group compared with that of the Southwestern, shown in Table 26.

The percentage relations in Table 25 show a similar striking likeness in relative cost plus interest in the first and third years covered by the table, and also in the second and fourth, to that in prices, which was commented on in the discussion of Table 24. For the Northwestern group relative cost plus interest is expressed by practically the same figures as relative prices. On the other hand, the fact that relative cost plus interest of the Southwestern group in 1917–18 is the same as the average for the 37 companies, while its relative price was 2 per cent above the average reflects the conditions which resulted in the much larger rate of profit realized by that group than by the other groups in 1917–18.

COMPARISON OF PROFIT PER BARREL OF THE 37 COMPANIES AND OF THE DIFFERENT GROUPS.—The following table shows the profit per barrel of flour sold for the 37 companies for each year from 1913–14 to 1917–18, together with that realized by the different groups in the same years; the increases and decreases in profit for the different groups, by years; and the relations of profits for the different groups in each year, the profit of the 37 companies being represented by 100.

TABLE 26.—*Comparison of profit per barrel of the 37 companies and of the different groups, by years, 1913–14 to 1917–18.*

	1913–14	1914–15	1915–16	1916–17	1917–18
37 companies	$0.14	$0.21	$0.14	$0.55	$0.65
Northwestern group	.13	.21	.15	.60	.58
Southwestern group	.14	.25	.16	.48	.88
Eastern group	.18	.15	.10	.43	.67
RELATIVE PERCENTAGE INCREASE OR DECREASE.					
37 companies	100	150	100	393	464
Northwestern group	100	162	115	462	446
Southwestern group	100	179	114	343	629
Eastern group	100	83	56	239	372
PERCENTAGE RELATIONS BY GROUPS.					
37 companies	100	100	100	100	100
Northwestern group	93	100	107	109	89
Southwestern group	100	119	114	87	135
Eastern group	129	71	71	78	103

Comment has already been made on the fact that the profit shown for 1917–18 in Table 22 is only for comparison with the investment per barrel. (See p. 78.) For example, the increase of 364 per cent in the profit of the 37 companies from 1913–14 to 1917–18 would be misleading if account was not also taken of the increase of 67 per cent in their investment. Furthermore, it must not be forgotten that the profits shown in Table 26 are the profits on all mill products sold. It is only in 1917–18, however, that this combined profit is appreciably different from the profit on wheat flour alone. Nevertheless, the combined profit has been shown for 1917–18, although it is appreciably more than the profit on wheat flour sales alone in that year because it was impossible to obtain a satisfactory profit per barrel figure on wheat flour alone, for the different groups.

It is obvious that the per barrel profit figures shown above are not comparable with the 25 cents per barrel margin agreed upon by the Food Administration and the millers for a part of the year 1917–18. Not only is the period covered different, but the 25 cents margin was at no time construed as covering all the operations of the companies, including their wheat elevator and jobbing departments. Table 26, on the contrary, covers all transactions carried on with the investment charged to the wheat-flour business.

Table 26 shows an increase in profit per barrel over the five-year period of 45 cents for the Northwestern group, 74 cents for the Southwestern, and 49 cents for the Eastern. Measured in percentages, the respective increases were 346 for the Northwestern, 529 for the Southwestern, and only 272 for the Eastern.

During the first three years covered by the table the increases over the profits in 1913–14 do not show sufficient difference for the Northwestern and Southwestern groups to call for comment. On the other hand, while these two groups were making some 15 per cent more profit in 1915–16 than in 1913–14, the profit of the Eastern group had gone down 44 per cent. In 1916–17 the Southwestern group also fell considerably behind the Northwestern, the increase for the latter amounting to 362 per cent while that for the former was 243 per cent and that for the Eastern only 139 per cent, above the 1913–14 figure. It is quite possible that a considerable part of the greater increase in profit for the Northwestern group in 1916–17 may have been due to the fact that the 1916–17 mill year of the Northwestern group included two very high-price months in the summer of 1917, after the close of the mill year of the Southwestern group. This view of the situation is supported by the fact that in 1917–18 the profit of the Southwestern group and, also, of the Eastern group, both showed remarkable increases (the mill year of these two groups is practically identical), while that of the Northwestern group decreased. It is

impossible to determine from annual figures how much this difference in the 12 months covered by the mill years of the different groups affect the figures shown in Table 26.

The relative rates of profit per barrel of flour show much greater variation between the several groups than was shown by investment, receipts, or cost plus interest figures. In no two years does there appear to be any similarity in these relative profits for the different groups. In 1915–16 and 1916–17 the relative profit for the Northwestern group was 7 per cent and 9 per cent, respectively, above the average of the 37 companies. On the other hand, in the first and last years of the table it was, respectively, 7 per cent and 11 per cent below the average. In three years of the five the Southwestern group showed a profit considerably in excess of the average. In 1917–18 this excess amounted to 35 per cent. In the preceding year, the only one in which its profit was less than the average, the difference was only 13 per cent. The best showing made by the Eastern group was in 1913–14, when its profit per barrel was 29 per cent above the average. In the two following years it was 29 per cent below the average. In 1916–17 it was 22 per cent below, but in 1917–18, 3 per cent above.

NOTE.—The Commission has compiled data from the accounts of 17 other companies for the years 1913–14 to 1916–17 and of 65 companies in 1917–18. These concerns are, in a general way, competitors of the 37 companies, selling in the same markets and making approximately the same kinds of flour. Their accounts have been very carefully revised and the information is probably as reliable as that obtained from the 37 companies, except that profits have been thrown from one year to another through the use of inventories at market price, which the Commission was unable to revise. It should be noted that in 1917–18 results are shown for about four times as many mills as in the previous years.

The average annual business for each of these mills was, roughly, one-fourth the average for the 37 companies; that is, not far from 250,000 barrels each per year. The accounts furnish no conclusive evidence that this difference in quantity of business resulted in any difference in the amount of capital employed per barrel of flour. Throwing the first two years of the war together to obviate to some extent the defect referred to in the preceding paragraph, it appears that these smaller companies made an appreciably larger rate of profit on investment than was made by the 37 companies. Pursuing the same method with the last two years, the situation was reversed and the 37 companies show larger profits than the smaller companies. This change may be due in part to bringing in a larger number of small mills. The accounts show, however, that the advance in prices was much less for the small companies than for the larger ones.

The earnings of 65 companies on their milling business in 1917–18 gave them an average profit of 55 cents per barrel of flour sold, while the corresponding profit for the 37 companies was 65 cents. Of these per barrel profits the 65 companies made about 4½ cents on miscellaneous milling and the 37 companies somewhere near 11 cents.

Section 10.—Costs in wheat-flour milling.

ANALYSIS OF PER-BARREL COST.—An analysis of the cost of making and selling a barrel of wheat flour based on expenditures of the 37 companies is presented in the following table. Corresponding analyses for the different groups are given in Exhibit VII.

TABLE 27.—*Analysis of the costs of the 37 companies in making and selling a barrel of wheat flour, by years, 1913–14 to 1917–18.*

Item of cost.	1913–14	1914–15	1915–16	1916–17	1917–18
Wheat	$3.96	$5.42	$5.09	$8.32	$9.72
Packages	.27	.23	.24	.31	.47
Mill operating costs	.22	.22	.21	.28	.37
General and selling expense	.30	.33	.31	.42	.41
Total cost of flour and feed	4.75	6.20	5.85	9.33	10.97
Charged to production of feed	.76	.84	.77	1.26	1.29
Net cost of flour per barrel[1]	3.99	5.36	5.08	8.07	9.68
Mill operating costs:					
Mill labor, power, and miscellaneous operating costs	.17	.17	.16	.22	.28
Repairs	.02	.02	.02	.03	.06
Depreciation[2]	.03	.03	.03	.03	.03
Total	.22	.22	.21	.28	.37
Total operating, general and selling costs[3]	.52	.55	.52	.70	.78

[1] Based on barrels of flour produced.
[2] Actual figures, 0.0316.
[3] These costs do not include interest charges, which amounted to 2 cents in 1914, 3 cents in 1915, 2 cents in 1916, 5 cents in 1917, and 4 cents in 1918.

The information presented in Table 27, it should be remembered, is not applicable to the entire milling business of the United States. It is important, however, because it represents, as near as could be ascertained without undue expenditure of time and money, the actual cost of about 35 per cent of the flour produced in the United States, the sales of which are so widely distributed that they largely determine the price level in practically every commercial flour market east of the Rocky Mountains, and even affect in some degree the range of flour prices on the Pacific coast.

The table shows that the prewar cost of making and selling a barrel of flour and delivering it at milling points or mill branch houses, generally packed in cotton or paper sacks, was $3.99. The effect of the first two years of the European war was to increase the total cost per barrel about 30 per cent—to $5.36 in 1914–15 and $5.08 in 1915–16. The semipanic conditions at the beginning of the war apparently increased the cost of wheat in 1914 considerably, but the world-wide bumper wheat crop of 1915 resulted in a somewhat lower cost in the following year.

In the early part of 1916–17 costs were not appreciably higher than the general level for the two preceding years, but an increasing de-

mand from Europe began to affect the price of wheat early in the year. The resulting advance of prices culminated in the panic of the spring of 1917. In May of that year wheat sold in Chicago for $3.45—more than a dollar higher than the price fixed by the Government in the following fall. Other costs also advanced considerably, with the result that the average net cost per barrel of flour made by the 37 companies throughout the year 1916–17 was $8.07.

The price of wheat was stabilized by the Government early in the mill year 1917–18. As a consequence, the average cost of $9.68 per barrel, shown in Table 27 for that year, is fairly representative of the cost of producing and distributing a barrel of flour throughout the year. It appears from the changes reviewed in the preceding paragraphs that the effect of the war on the cost of wheat flour in the United States was an advance of fully 140 per cent. The advances in the different items of cost were as follows: Wheat, 146 per cent; packages, 74 per cent; mill operating costs, 68 per cent; general and selling expenses, 37 per cent. In 1917–18 the wheat used in a barrel of flour cost $5.76 more than it did in 1913–14, while all other costs had increased only 46 cents.

The deduction from total cost, charged to the production of feed, increased from 76 cents in 1913–14 to $1.29 in 1917–18. The millers would undoubtedly have realized considerably more than $1.29 for feed in 1917–18 had it not been for Government price restrictions.

Cost of wheat.—Table 27 shows clearly the importance of the cost of wheat in the manufacture of flour. Usually about 70 per cent of the wheat ground is sold in the form of flour. A relatively simple process crushes the grain and removes the offal. Flour is sometimes sold at the mill for less than the cost of the wheat used in making it. This preponderance of the cost of wheat in wheat-flour costs, together with the influence of the quality and quantity of easily available wheat on the prosperity of milling enterprises (see Exhibit VI), calls for a more detailed discussion of the supply of wheat.

Demand and supply factors affecting the miller's cost of wheat.—The following discussion of the wheat crop of the United States and the various uses made of that crop in recent years is based largely on the United States Food Administration's compilation of data collected by the Government and by statisticians of wheat and flour trade publications. Much of the available information is based on estimates. Nevertheless, the care with which these estimates are made warrants their use in comparative tables and the acceptance of the indicated changes in wheat production and consumption with a considerable degree of confidence. In any satisfactory discussion of the situation in the United States, however, it is necessary to have

some information in regard to the production and consumption of wheat in other countries and in earlier years.[40]

Changes in the stock of wheat on hand July 1, of each of the five years under review, the wheat crop, the net exports of wheat, and the indicated quantity of wheat used in the United States in each year is shown in the following table:

TABLE 28.—*The wheat crop of the United States and quantities exported, consumed, and left in stock, by years, 1913–14 to 1917–18.*

[In millions of bushels.]

Crop year.	Stock [a] on July 1.	Crop.[b]	Increase or decrease in stock.	Wheat used and exported.	Net [c] exports.	Wheat used in United States.
1913–14	108	763	− 24	787	91	696
1914–15	84	891	− 22	913	259	654
1915–16	62	1,026	+115	911	168	743
1916–17	177	636	−122	758	126	632
1917–18	55	637	− 34	671	7	664
1918–19	21	.....	.....	.....	.....	.....

[40] Available data show a world wheat crop which did not vary greatly from year to year and which averaged practically 2½ billion bushels annually for the 7 years beginning with 1891. In 1898 the crop jumped to nearly 3 billion bushels, and the average for the next 10 years was but little above that figure, with a variation of less than 15 per cent up or down in any one year. In 1909 the crop rose to over 3½ billion bushels, and it did not fall below that figure again until the beginning of the European war. In 1913, and again in 1915, the crop exceeded 4 billion bushels. Over 90 per cent of this wheat is produced north of the Equator. As late as 1915 the United States produced practically one-fourth of the entire crop. It had produced about the same proportion of the total crop in 1891 and in 1901. These three years were the high points in its contribution to the world's supply over the period covered by available data. A period of relatively low production in this country covered the four years 1893 to 1896, inclusive. Other low-production years were 1904, 1911, and 1916. In none of these years did the crop in the United States materially exceed one-sixth of the world crop.

Other important producing countries are Russia, Canada, Argentina, Australia, Roumania, and British India. The average annual exports of these countries in excess of their imports from other countries (including flour as wheat) in the five-year period just prior to the war, 1909–1913, amounted to 610 million bushels. For different countries they were, in round numbers, as follows:

Russia	165 million bushels.
United States	105 million bushels.
Canada	95 million bushels.
Argentina	85 million bushels.
Australia	55 million bushels.
Roumania	55 million bushels.
British India	50 million bushels.

Eight countries consumed three-fourths of the world's supply during these same years. Their consumption was as follows:

Russia	650 million bushels.
United States	580 million bushels.
France	360 million bushels.
British India	300 million bushels.
United Kingdom	275 million bushels.
Austria-Hungary	240 million bushels.
Italy	235 million bushels.
Germany	220 million bushels.

Four of these countries, United Kingdom, Germany, Italy, and France, were the great importing countries. Their average annual net importations of wheat during the five years preceding the war, 1909 to 1913, were about 380 million bushels. Belgium was importing 50 million bushels and other European countries about 75 million bushels during the same period.

The statistical information in the preceding paragraph was taken from Documentary Leaflets of the International Institute of Agriculture, June, 1919, pp. 14 and 15. Data available in regard to the world supply of wheat and its distribution since the opening of the European war are very incomplete.

[a] Based on the United States Food Administration's compilation of data collected by the Government and trade statistical organizations.

[b] Statistical Abstract, 1918, p. 159.

[c] Exclusive of flour. Statistical Abstract, 1918, pp. 431, 478, and 510.

Before proceeding to the discussion of Table 28, attention should again be called to the increase in the country's wheat crop referred to on page 12.

In recent years the country has used in its mills and otherwise 90 million bushels a year more than it produced 20 years ago, and the crop of 10 years ago would have provided no wheat for export except as flour during the last six years. Table 28 shows that the remarkable increase in the wheat crops of the United States culminated in a harvest of 1,026,000,000 bushels in 1915. In 1916 the crop amounted to 636 million bushels, and in 1917 to 637 millions; in neither year was it much more than 60 per cent of the crop in 1915.

Gradually increasing stocks had been held over from the harvests preceding that of 1913. As a result, the stock on hand on July 1 of that year amounted to 108 million bushels. To this there was added during the year a crop of 763 million bushels. Under these circumstances the ordinary means of disposing of wheat failed the farmer, and the United States Food Administration data indicate that he increased the quantity of wheat used as stock feed from 15 million bushels in the preceding year to 55 million bushels in 1913–14. He also sold his wheat for 79 cents per bushel, or 6 cents less than the average price realized from the 1912 crop. By feeding it to stock and selling it at a reduced price the quantity of wheat used in the United States in 1913–14 was increased to 696 million bushels, or 79 million bushels more than the consumption in the preceding year. Apparently the low price and the use of wheat as stock feed was discouraging to the spring-wheat farmers, who reduced their wheat acreage appreciably in the spring of 1914. The farmers in the hard-wheat States of the Southwest, not so easily discouraged, put millions of acres more into wheat in the fall of 1913 than ever before. Consequently, there was an increase in the crop of wheat in the States of Colorado, Kansas, Nebraska, Oklahoma, and Texas from 190,138,000 bushels in 1913 to 318,669,000 bushels in 1914. The resulting crop of 891 million bushels for the entire country made it possible to meet the extraordinary export demands of the opening year of the war with a reduction in stocks from the beginning to the end of the crop year, 1914–15, amounting to only 22 million bushels.

That year the average price realized by the farmers throughout the United States advanced to 99 cents, and, as was naturally to be expected, the acreage sown to wheat increased, namely, from 54,661,000 in 1914 to 61,173,000 in 1915. Yet even this remarkable acreage would have resulted in no great increase in stocks had it not been for the greatly increased yield per acre in the hard spring-wheat States of the Northwest, which resulted in almost doubling the crop harvested in Minnesota, Montana, North Dakota, South Dakota, and Wyoming. The good fortune of the spring-wheat farmers,

though offset to some extent by a decreased yield per acre in the winter-wheat States, resulted in the great harvest of 1915 noted above. Heavy crops in Canada, Australia, and Argentina, together with favorable conditions of transportation, made Europe more independent of the United States in the following year, and the net exports of wheat dropped from 259 to 168 million bushels. Throughout the larger part of the country the wheat raised was of poor quality and probably, in part, for that reason it was fed to live stock in large quantities. Nevertheless, as Table 28 shows, the stock on hand was 115 million bushels larger on July 1, 1916, than it had been 12 months earlier. Total consumption in the United States had increased to 743 million bushels.

In the face of this accumulation of stock, wheat sown in 1916 fell off from 61 to 57 million acres. This smaller acreage, accompanied by a lower yield per acre, resulted in the extraordinary reduction in the crop already referred to. Table 28 shows that the wheat crop of 1916 was practically all consumed in the United States. Early in the mill year 1916–17 the European countries engaged in the war realized for the first time the extent of the emergency in regard to their food supplies. Their strenuous efforts to provide for this emergency resulted in the wheat and flour panic of the spring of 1917. Although the small crop made it necessary to reduce shipments, net exports for that year amounted to 126 million bushels. As a consequence of the advance in prices during the year, the reported average price realized by the farmer for the crop of 1916 amounted to $1.44. Millers were ready to use all available wheat and stocks went down more than they had gone up on account of the enormous harvest of 1915. Stocks of flour measured in bushels of wheat also fell off about 12 million bushels.

The farmers of the winter wheat section had put in their wheat for the crop of 1917 before the advance in prices. Consequently, there was no great increase in the acreage sown and unfavorable crop conditions reduced the number of acres harvested, compared with the previous year, about 7 millions. Although the spring-wheat farmers increased the acreage somewhat and the yield per acre was better, the entire crop showed no considerable increase, amounting to only 637 million bushels. The table shows that the consumption in the United States that year exceeded the crop raised by over 25 million bushels. Nevertheless, in response to the urgent demand from Europe, exports in excess of imports amounted to 7 million bushels, and reduced the stock of wheat on hand at the end of the five-year period to 21 million bushels.

Table 28 furnishes an excellent illustration of the steadiness of the consumption of wheat within a given area and the variability of the supply. Maximum consumption of wheat shown for any year was

743 million bushels in 1915–16, only 10 per cent above the average for the five years. The minimum consumption, 632 million bushels in 1916–17, was only 7 per cent below the average. The difference between the maximum and the minimum consumption was 111 million bushels, but the difference shown between the largest and the smallest crop was 390 million bushels.

The safety valves in this situation are net exports and reserve stocks which are continually moving up and down. In 1914–15 net exports were 37 times as much as in 1917–18, and the reserves of wheat at the end of 1915–16, 177 million bushels, were more than 8 times the 21 millions left at the end of 1917–18.

Estimates of the annual consumption of wheat in the United States, separated into feed for live stock, seed, and mill consumption, together with net exports of flour expressed as wheat, are shown in the following table:

TABLE 29.—*Analysis of the consumption of wheat in the United States, by years, 1913–14 to 1917–18.*

[In millions of bushels.]

Crop year.	Total consumption.[1]	Fed to stock.[2]	Used for seed.[2]	Mill consumption.[3]	Exported as flour.[4]
1913–14	696	55	75	566	53.1
1914–15	654	20	84	550	72.5
1915–16	743	74	79	590	68.4
1916–17	632	13	82	537	53.0
1917–18	664	13	89	562	95.8

[1] See Table 28.
[2] From compilation by the United States Food Administration.
[3] Includes an insignificant quantity used in distilling.
[4] Statistical Abstract, 1918, pp. 431, 478, and 510.

The mill consumption of wheat shown in Table 29 is obtained by subtracting the estimated quantity used for seed and fed to live live stock from estimated total consumption. By this method the entire waste in storage and transportation is apparently included in the figures for mill consumption, which also covers an insignificant quantity (which has no effect on the figures expressed in millions) of wheat used in distilleries.

According to the census the merchant mills of the country used 545,728,431 bushels of wheat in 1914. This is 96 per cent of the amount shown above as used in mill products and wasted during the mill year 1913–14. The same authority shows practically the same per cent of a corresponding supply figure as used in 1904, but for 1909 the per cent shown as used is only 92. For the year 1917–18 Food Administration reports show 93 per cent of the available supply indicated above as used in flour. This difference is probably due in considerable part to consumption by custom mills, and the element of waste referred to in the preceding paragraph, but it also empha-

sizes the fact that the data in Table 22 are only the best available estimates.

The consumption of wheat in the United States shown for 1913–14 in Table 29 was relatively large, as might have been expected from the accumulation of wheat at the beginning of the year, already referred to, and to the fact that the average price realized by the farmer from the 1913 crop, 79 cents per bushel, was at the lowest point reached in years—about 20 per cent lower than the price five years earlier and less than 40 per cent of the price realized from crops of 1917 and 1918. The natural consequences of this situation are shown by Table 29 in the larger quantity of wheat fed to live stock, the relatively small use for seed, and the heavy mill consumption. The quantity of export shown for 1913–14 by the table indicates that similar conditions prevailed in other countries, as shipments of flour abroad had been much larger in earlier years.

The figures in the table reflect fairly well the situation that developed in 1914–15 because of the war. Due to the very large exports of wheat in that year, shown in Table 28, the farmers found it unprofitable to feed so much wheat to live stock but, on the contrary, increased the quantity sown from 75 million to 84 million bushels. Millers found their cost of wheat increased considerably, and as the demand from abroad was to a large extent for wheat as distinguished from wheat flour, mill consumption decreased from 566 millions to 550 millions in 1914–15.

Conditions that brought about the increase in total consumption to 743 million bushels in 1915–16 have already been reviewed. The enormous crop decreased prices in spite of the war demand and, as was to be expected, the farmer increased the quantity fed to live stock and decreased the quantity sown. It is probable that the big increase in the quantity fed to live stock was, as already noted, due to the poor quality of the wheat raised in 1915 quite as much as to the low price. Furthermore, the considerable increase shown in the mill consumption from 550 million bushels in 1914–15 to 590 million bushels in 1915–16 was not due to the larger crop throughout the country but, in a considerable degree, to the excellent quality and the very large production of hard spring wheat in 1915. The declining exports of wheat flour in 1915–16 is especially to be noted in connection with the fact that Table 14 shows a decline of 30 cents in the price of flour received by the millers in that year, while the average price received by the farmer for wheat went down only 1 cent per bushel.

The effect of the nearly 40 per cent decrease in the crop of 1916 as compared with that of 1915 is clearly shown in the decline of total consumption from 743 million bushels in 1915–16 to 632 million bushels in 1916–17. The table shows the effects normally to be

expected in the use of wheat for stock and in increased quantity used for seed. In spite of a crop 390 million bushels short of that in the preceding year and increase in the cost of wheat to the miller as represented by the 37 companies from $1.12 per bushel to $1.81, mill consumption decreased only 53 million bushels—to 537 millions. Export of flour continued to drop, reaching the same figure as in 1913–14.

Data for the year 1917–18 presented in Table 29 reflect clearly the critical condition in that year, due to the war. The use of 13 million bushels of wheat as live-stock feed, in spite of the small crop and the increase in total consumption to 664 million bushels (see Table 28), indicates that even under conditions of very great scarcity in the wheat supply there is a certain proportion of the crop that can not be milled profitably. The increased use of wheat for seed was of course in direct response to appeals for the largest possible production. Neither was the considerable increase in the mill consumption to 562 million bushels in 1917–18 the result of a normal response of commercial milling to the conditions of scarcity indicated by the increase in exports of flour expressed as wheat, from 53 million bushels to 95.8 million bushels. Comment has already been made on the fact that in this year the production of many large commercial mills was very considerably decreased. (See p. 59.) The increase in mill consumption shown by Table 29 was therefore due to a considerable development under Government regulation of the production of wheat flour in mills of small and medium size throughout the country.

Wheat used per barrel of flour.—The quantity of wheat used in producing a barrel of flour and the cost of wheat per bushel and per barrel, for the 37 companies and for the different groups, is shown, by years, from 1913–14 to 1917–18, in the following table:

TABLE 30.—*Wheat costs of the 37 companies, by years, 1913–14 to 1917–18.*

	1913–14	1914–15	1915–16	1916–17	1917–18
Wheat used (bushels per barrel)	4.42	4.52	4.54	4.60	4.44
Northwestern group	4.40	4.52	4.53	4.64	4.40
Southwestern group	4.51	4.51	4.59	4.53	4.55
Eastern group	4.48	4.51	4.56	4.52	4.48
Cost of wheat used (per bushel)	$0.90	$1.20	$1.12	$1.81	$2.19
Northwestern group	.89	1.22	1.10	1.84	2.18
Southwestern group	.86	1.09	1.08	1.67	2.15
Eastern group	.95	1.22	1.23	1.80	2.26
Cost of wheat per barrel of flour	3.96	5.42	5.09	8.32	9.72
Northwestern group	3.90	5.52	4.99	8.55	9.61
Southwestern group	3.90	4.90	4.97	7.56	9.77
Eastern group	4.28	5.50	5.63	8.16	10.15

The data in Table 30 confirms the well-established presumption that a barrel of good flour can be made from 4½ bushels of wheat. Taken in connection with the census figures referred to on page 13, which show an average consumption for the United States of 4.7 bushels per barrel, they make it fairly certain that the commercial mills use less wheat per barrel of flour ground than the smaller neighborhood mills. This, of course, is only confirmatory of the accepted opinion that the superior equipment of the large mills gives them an advantage in this respect over the small mills.

The considerable variation in the wheat used per barrel of flour in different years and by different groups is the result of so many more or less conflicting causes, that only a brief reference to some of the more important is feasible in this report. The table shows that considerable more wheat was used per barrel of flour in the intermediate years 1914–15 to 1916–17 than in 1913–14 and 1917–18. The considerable decrease in the quantity per barrel used in 1917–18 was the direct effect of the Government's requirement, over a good part of the year, that only 4.4 bushels of wheat should be used per barrel of flour.

General market information indicates that an increasing demand for the higher grade of patent flour on the one hand, and for meats and dairy products on the other, might have had something to do with this increased consumption of wheat per barrel of flour in 1915–16 and 1916–17. Increased demand for meats and dairy products must necessarily reflect itself in an increased demand for feed, and the more feed a miller takes from a bushel of wheat the less flour will remain.

Data in regard to the quantity and quality of the wheat harvest in different years indicate that changes in these two factors were more influential than changes in demand for different mill products in bringing about the increase in wheat used per barrel of flour in different years and different sections. For example, the increase in 1915–16 for the 37 companies coincides with the billion-bushel crop and the prevalence of excessive moisture in most of the wheat harvested. In 1916–17, apparently because of decreased supply (see p. 95) the East and the Southwest used less wheat per barrel than the year before, but in spite of a very short crop in the Northwest that group used considerably more than in 1915–16. The poor quality and light weight of the hard spring wheat raised in 1916 probably explains why the Northwestern group used 4.64 bushels of wheat per barrel of flour ground in 1916–17.

Cost of wheat per bushel.—Table 30 shows that the average cost of wheat for the 37 companies was more than twice as much in 1916–17 as in 1913–14. A fact not shown by the table is that the price in

the last part of the mill year 1916–17 was over three times what it had been at its beginning. The success of the Government's efforts to stabilize wheat prices is shown by the increase of but little over 20 per cent in the average cost to the mills from 1916–17 to 1917–18.

The Eastern and Southwestern groups show higher relative costs in 1915–16 than might be expected; that is, they do not go down like those of the Northwest. Of course, the remarkable increase in the crop of the Northwest, together with the poor quality and high percentage of moisture, which increased the quantity used per barrel in other sections of the country, had much to do with holding up the relative cost per bushel for the Eastern and Southwestern groups.

The cutting of the 1916 Northwestern crop to but little over a third of what it was in 1915 explains why the cost of wheat used by the Northwestern group in 1916–17 was even higher than that paid by the Eastern group. It is also undoubtedly true that a part of this difference is due to the difference in the mill year repeatedly referred to.

In 1917–18 under Government stabilization of wheat prices the respective costs of wheat per bushel for the three groups show about the variations to be expected from differences in transportation costs.

Further light on the variations in cost per bushel of the different groups is furnished by sectional variations in the crops. The short crop of 1914 in the Northwest and the heavy crop in the Southwest are plainly reflected in an increase in the cost per bushel for the Northwest over 40 per cent greater than for the Southwest in 1914–15. Superior availability for export to Europe apparently held up the relative value of eastern wheat in spite of the increasing output.

Cost of wheat per barrel of flour.—The discussions of crop and market conditions have already given the general causes of the increase in the cost per barrel by $1.46, or over 35 per cent, in 1914–15. The drop of 33 cents the next year resulted from the immense crop of 1915 and the great reduction in exports of wheat.

The salient facts are that after two years of war, wheat cost the millers only about 30 per cent more than it did prior to the war, but that in the two succeeding years short crops and submarines, reinforced to some extent by various other factors, forced an advance to nearly 150 per cent above the prewar level.

COST OF PACKAGES.—The cost of packages per barrel of flour, for the 37 companies and the different groups, by years, from 1913–14 to 1917–18, is shown in the following table:

TABLE 31.—*Cost of packages per barrel of flour of the 37 companies, by groups and by years, 1913–14 to 1917–18.*

	1913–14	1914–15	1915–16	1916–17	1917–18
	Cents.	*Cents.*	*Cents.*	*Cents.*	*Cents.*
37 companies	27	23	24	31	47
Northwestern group	27	23	25	32	46
Southwestern group	26	22	22	28	48
Eastern group	29	25	25	32	47

According to Table 31, the cost of packages for the different groups shows no such difference as the cost of wheat. When the variety of containers in which flour is sold is considered, and also the sales in bulk, the similarity of package costs per barrel is remarkable. Because of the large use of cotton bags, the figures reflect the immediate effect of the war in cutting down the price of cotton of the crop of 1914, but they did not increase nearly as much from 1914–15 to 1917–18 as the higher price of cotton would lead one to expect. Whether the costs of sacks as compared with cotton and jute were relatively high in the earlier years does not appear from the available data.

It was not feasible to make any general revision of cost of packages as reported by the companies. In some cases where important changes from actual cost were found, corrections were made. It did not appear probable that the large amount of work that a careful revision of inventories would require would make any considerable changes in the table as presented above.

OPERATING COSTS, INCLUDING REPAIRS AND DEPRECIATION.—Operating costs in making a barrel of flour, including labor expenses, power and fuel expenses, and miscellaneous expenses directly connected with making the flour, together with charges for repairs and depreciation, are shown for the 37 companies and for the different groups, by years, from 1913–14 to 1917–18, in the following table:

TABLE 32.—*Operating costs per barrel of flour, including repairs and depreciation, of the 37 companies, by groups and by years, 1913–14 to 1917–18.*

	1913–14	1914–15	1915–16	1916–17	1917–18
	Cents.	*Cents.*	*Cents.*	*Cents.*	*Cents.*
37 companies	22	22	21	28	37
Northwestern group	20	21	20	26	36
Southwestern group	26	25	25	28	37
Eastern group	27	25	25	34	37

Table 32 shows no appreciable increase in the cost of operation, including repairs and depreciation, during the first three years of the period covered, either for the 37 companies as a whole or for either of the groups.

In 1916–17 the effects of the war began to make themselves evident. It should be remembered, however, that the average expenses as given in the table do not show the changing conditions throughout the year.

The operating expenses shown for 1917–18 were 65 per cent greater than they were before the war and for more than two years after it started. Under Government regulation of the flour industry the cost of operation was practically the same in all groups.

The lower cost shown above for the Northwest, during the first four years, may have been due in part to the advantages of large scale production (see p. 59). Thus the charge for depreciation in the Northwest was over a cent per barrel less than for the Eastern group of mills. Nevertheless, the greater increase in the costs of operation in the Northwest brought them practically to a level with those of the other groups in 1917–18.

Operating costs for the Northwest were increasing rapidly, even in 1915–16, when the tables show a decrease per barrel. A heavy increase in expenses in that year was more than offset in the per barrel figures by an increase of nearly 25 per cent in the production. The change in output for the two other groups was not sufficient to have any effect on the per barrel data. Thus the total expenses for repairs decreased slightly for each of the smaller groups, but increased from $636,000 in 1914–15 to $789,000 in 1915–16 for the Northwestern group without any appreciable change in the cost per barrel.

It was impossible to analyze the expense accounts of the different mills in sufficient detail to determine the causes of these changes in the operating expenses of the different groups. It does appear, however, that the bulk of the advance in costs for the Northwestern group in 1916–17 was incurred by the four companies which have the largest output. The company which showed the greatest increase in output had a heavy increase in per barrel expense for power and fuel. For the company showing the second largest increase in these expenses, the expenses involving labor or other local charges apparently increased less than those of a more miscellaneous character, such as supplies brought in from a distance.

GENERAL AND SELLING EXPENSES PER BARREL OF FLOUR.—A table showing general and selling expenses for the 37 companies and for each group year by year during the five-year period is presented below:

TABLE 33.—*General and selling expenses per barrel of flour of the 37 companies, by groups and by years, 1913–14 to 1917–18.*

	1913–14	1914–15	1915–16	1916–17	1917–18
	Cents.	*Cents.*	*Cents.*	*Cents.*	*Cents.*
37 companies	30	33	31	42	41
Northwestern group	30	34	31	44	42
Southwestern group	25	25	24	31	36
Eastern group	34	32	35	44	41

As in the case of operating expenses, it is not practicable to give a full analysis or explanation of these items. It is interesting to note, however, certain contrasts between the figures for the different groups and also certain contrasts with the operating cost shown in Table 32.

The figures for 1916–17 show the effect on the general and selling expense of the remarkable prosperity of the mills in that year. In spite of the advancing prices, Table 32 shows that the Northwestern group had an increase in operating cost of only 6 cents per barrel, but Table 33 shows that general and selling expenses were increased by 13 cents per barrel. This reflects very considerable additions to the salaries paid the managers of the business and the managers of important branch houses.

The full influence of large profits on the general and selling expenses of the Southwestern group was not felt until 1917–18. In that year these expenses advanced 50 per cent over those of two years before. Nevertheless, the general and selling expenses of this group over the entire period afforded no exception to the general rule that costs for the three groups tended to approach each other. In 1913–14 general and selling expenses for the Southwestern group had been 5 cents per barrel below the average and in 1917–18 the same difference persisted. Of course, this corresponds to a smaller percentage difference from the average in the last year than in the first. While these expenses for the Eastern group were 4 cents higher than for the Northwestern group in 1913–14, in 1917–18 they were higher for the Northwestern than for the Eastern.

Operating, selling, and general expenses.—Operating expenses combined with general and selling expenses for the 37 companies and each of the groups, by years, from 1913–14 to 1917–18, are shown in the following table:

Table 34.—*Total operating, selling, and general expenses per barrel of flour of the 37 companies, by groups and by years, 1913–14 to 1917–18.*

	1913–14	1914–15	1915–16	1916–17	1917–18
	Cents.	*Cents.*	*Cents.*	*Cents.*	*Cents.*
37 companies	52	55	52	70	78
Northwestern group	50	55	51	70	79
Southwestern group	51	50	49	59	72
Eastern group	61	57	60	78	78

This table confirms the fact already noted, that the costs of making and selling flour increased much more slowly than the cost of the materials and supplies used in its manufacture. While it shows an advance of practically 50 per cent in the costs of making and selling the flour, an advance which amounts to only 26 cents for each barrel of flour, Table 27 shows an advance of $5.96 in the cost of the wheat used and packages required.

The variation in cost of making and selling flour for the different groups in 1913–14 was 11 cents, but in the last year of the period it had decreased to 7 cents. In 1913–14 these costs for the Southwestern group were 1 cent more than for the Northwestern group. In 1917–18 costs for the Northwestern were 7 cents more than those for the Southwestern. Of this 7 cents difference, 6 cents is accounted for by the excess of general and selling expenses of the former group over those of the latter in 1917–18.

Section 11. Relative efficiency of flour-milling companies.

Quantity of output is generally regarded as an important element in the efficiency of commercial operation. Indeed, from the discussion of localization and concentration of the wheat-flour milling industry in Chapter I, it appears that in the United States mills of less than 100,000 barrels output have for years been declining in importance, probably because they have been unable to compete successfully with the larger concerns. The data reviewed there gave no indication, however, as to the relative efficiency of companies having an output of over 100,000 barrels, and it is important, therefore, to consider the information afforded by the accounts of the companies considered above which relates to this question.

The information in regard to some of the companies is of such a character that it is more satisfactory for use in consolidated form, as in the preceding parts of this chapter, but the broader facts obtained by a comparison of different groups of these companies over a five-year period have presumably general validity. The abnormal condition prevailing in 1916–17 and 1917–18, however, exercised a disturbing influence on competitive conditions which may have altered somewhat the ordinary relations between companies of different size or different character of plant and equipment.

One of the best indications of competitive efficiency is the rate of profit on investment. Low cost is also an indication of efficiency, but a low-cost concern may not have a very high rate of return where such low cost depends on large plant investment. Nevertheless, low cost may be a factor that will enable a concern to weather the most severe price competition, but if the investment is relatively large it will tend to keep down the rate of return when prices are higher.

The following table, which covers the total operations for the five-year period presented in previous tables, groups the 38 [41] companies according to volume of sales and compares the investment, net earnings, and the ratios between them. It also compares the costs, profits, and the investment per barrel of flour.

[41] One company which was absorbed by another at the end of the period was separately operated and is treated as a separate company in this table.

TABLE 35.—*Average investment, earnings, and rate of profit, together with costs, profits, and investments per barrel of 38 wheat-flour milling companies grouped according to volume of sales, five-year period, 1913–14 to 1917–18.*[1]

	Number of companies.	Barrels sold.	Investment.	Earnings.	Rate of earnings on investment.	Cost per barrel.	Profit per barrel.	Investment per barrel.
					Per ct.			
Group I:[2] Over 1,000,000 barrels.	7	28,462,159	$43,489,771	$9,691,270	22.2	$6.30	$0.34	$1.53
Group II: 300,000 to 700,000 barrels	14	6,831,837	9,118,757	2,125,767	23.3	6.14	.31	1.33
Group III: Under 300,000 barrels	17	3,283,778	4,774,209	946,623	19.8	6.49	.29	1.45
Total	38	38,577,774	57,382,737	12,763,660	22.2	6.29	.33	1.49

[1] Some of the revisions which were made by the Commission with respect to the financial results of these companies in the territorial grouping were not practicable in this grouping according to size, so that the aggregates and averages do not exactly agree.
[2] Includes one company with sales slightly under 1,000,000 barrels.

The most striking fact shown by this table is the comparatively small difference in the average rate of profit for the different groups. The group having sales per company running from 300,000 to 700,000 barrels had the highest rate of profit (23.3 per cent). The group with the smallest sales per company had the lowest rate (19.8 per cent). The rate of profit realized by the first group, which had by far the largest sales per company, was the same as the average for the 38 companies (22.2 per cent). This group, however, includes one company operating under exceptional conditions, apparently, and with a low rate of profit; if this company were eliminated from the comparison the average rate of profit of this group would be 25 per cent.

Of considerable interest also are the figures for cost, profit, and investment per barrel. Group II shows both the lowest average cost ($6.14) and the lowest average investment ($1.33) per barrel; its profit per barrel (31 cents), however, was less than the average. The rate of profit on investment of this group as already shown was the highest. The third group showed the highest cost per barrel ($6.49), the lowest profit per barrel (29 cents), and an investment per barrel somewhat under the average. This group made the lowest rate of profit on investment, as shown above, and appears to have been in the least favorable position. The first group, on the other hand, had a considerably higher cost per barrel ($6.30) than Group II, a somewhat higher average profit per barrel (34 cents), and a much higher average investment per barrel ($1.53). Its rate of return on investment therefore was slightly lower than that of Group II. As already pointed out, if one company, which operated under exceptional conditions apparently, and with a low rate of profit, were eliminated from this group its rate of profit would be slightly higher than that of the second group. It may be noted that with this change the cost per barrel would be reduced to $6.27 and the invest-

ment per barrel to $1.32, though the profit per barrel would remain substantially the same.

Considering facts presented above and without ascribing a very high degree of accuracy to the data, it seems reasonable to conclude that size is not a decisive factor in determining the commercial efficiency of the larger wheat-flour milling companies.

Section 12. Wheat-flour milling in Washington and Oregon.

Idaho, which has been grouped with Washington and Oregon in tabulations of wheat and flour production in this report, has no mills of any considerable commercial importance. In fact, there is no distinctly segregated wheat-flour industry in the two coast States. The important milling concerns are also the important wheat-marketing concerns. Their problem is to dispose of the surplus wheat produced in that section in the most profitable form, whether that be flour, cereal foods, feeds, or grain. How much more important wheat marketing is on the Northwest coast than in the rest of the country is strikingly illustrated by the harvest of 1917. Outside of these three States the United States in that year produced hardly enough wheat to supply its mills and to seed its fields. But even in that low-crop year Washington, Oregon, and Idaho harvested not far from twice the wheat they consumed in both these ways.

Attention has already been called to the rapid development of milling in the Pacific Northwest because of its abundant wheat supply. (See p. 23.) From 1913–14 to 1917–18 the mills whose accounts were used by the Commission increased their output somewhat, while the output in other sections of the country fell off.

The data presented below do not show the progress of a strictly comparable group during the five years. It covers the flour sales of 14 companies in the first three years, 15 in the fourth, and 16 in the fifth. These companies sold 3,659,917 barrels of flour for $13,283,265.10 in 1913–14 and 4,590,600 barrels for $40,407,901.86 in 1917–18. It has not been possible to revise these accounts as thoroughly as those of the 37 companies. Probably the most unsatisfactory point in this regard was the impracticability of revising inventories taken at market value instead of cost.

The flour accounts showed receipts per barrel of flour as follows: In 1913–14, $3.83; 1914–15, $4.86; 1915–16, $4.47; 1916–17, $6.27; 1917–18, $9.47. As in the case of the 37 companies, these flour accounts contained some debits and credits aside from cash receipts for flour and cash discounts. These prices may be accepted, however, as comparable from year to year, and it is therefore safe to say that the flour made in the Pacific Northwest sold for nearly 150 per cent more per barrel in 1917–18 than in 1913–14. The average annual mill value of the flour sold in the Pacific Northwest ran from 32 cents

to $2.28 below the mill value of the eastern flour. The advance because of the flour panic in the spring of 1917 was less than it was even in hard winter wheat flour. (See p. 84.)

It is impracticable to discuss in this report the many factors that influence the prices received by millers in the Pacific Northwest. A few of the more important may be listed as follows:

1. Competition in their own home market with the Montana hard spring wheat mills.
2. Competition in California and the Southwest with the hard winter wheat mills of the Southwestern group.
3. Competition in the cotton States with the soft wheat mills of the Eastern group.
4. Fluctuations in demand for flour in the Orient and South America.

It was not practicable to separate the investment in flour milling from the investment in the cereal, feed, and grain enterprises of the concerns whose accounts were used. The per barrel investment figure, including these subsidiary branches of the business, is the figure that is of practical importance and represents correctly the amount of capital employed per barrel of flour sold in the Pacific Northwest. This, therefore, is the figure that should be used for comparison with the more strictly wheat flour investment already shown for the eastern mills.

In 1913–14 the investment computed per barrel of sales for the Pacific Northwest was $2.50; nearly 50 per cent more than was shown for the Eastern group, and considerably over twice what was used in the hard spring wheat mills. There was no such increase there during the five-year period as in the East. Indeed the Pacific group shows an increase of barely 10 per cent during the five years, in contrast to the increase of 67 per cent for the 37 companies. While the reason for this difference is not clear it appears probable that Government operations, which assured a market without the maintenance of grain, feed, and export departments on the same scale as in former years, was the most important factor. Another factor of considerable importance, however, was a greater increase in the use of short-time loans not counted as investment.

The character of the data obtained made it impossible to compute a satisfactory cost for wheat flour. The only practical method was to proceed as with investment and charge all income and all expenses to the flour account. It was the net income thus obtained which was used in computing the rate of return on investment and also the net income per barrel of flour sales.

The changes in rate of return on investment fluctuate directly with the corresponding figure for eastern mills. Starting roughly at 6 per cent in 1913–14, they were three times that rate in the next

year, dropped back to 8 per cent in 1915–16, showed a nearly fourfold increase the next year, to 31 per cent, but fell to 21 per cent in 1917–18.

The changes in per barrel profits were approximately parallel to those in the rate of return on investment. In 1913–14 they were 15.5 cents; in 1914–15, 52.6 cents; in 1915–16, 24.8 cents; in 1916–17, 85.7 cents; and in 1917–18, 58.7 cents. This group made 2½ times the profit per barrel that was made by the 37 companies in 1914–15. The profit per barrel was greater than that made by the 37 companies on account of the large miscellaneous business, but large investment resulted in the low rate of return already noted.

The European war was, of course, the primary factor in the increase in profits. It took increased exports of wheat out of a decreased crop in the Pacific Northwest. The resulting scarcity of wheat in that section raised prices of feeds and miscellaneous products so that the net cost of flour per barrel was kept down and in that way, though the price of flour went up only $1.03 per barrel compared with an advance of $1.40 for the 37 companies, the net effect was the much larger net profit referred to above.

The relatively low rate of profit per barrel, and on investment, in 1915–16 was probably due to more competition from the East, because of the great increase in business done by the hard spring wheat States in that year. Because of the impracticability of putting the inventories of these companies on a cost basis, comparisons are safer when the profit figures for the last two years are combined. When this is done the resulting profit per barrel of flour is found to be (as in the first year of the five) somewhat higher than for the 37 companies but the rate realized on investment considerably lower.

The share of the Federal Government in the distribution of profits in 1918–19 is quite as impossible to determine for this group as for the 37 companies.

Exhibit I.

Tonnage of flour—railroads of United States.[1]

Year ending June 30.	Originating on road.	Received from connecting roads and other carriers.	Total.
	Tons.	*Tons.*	*Tons.*
1910 [2]	8,038,684	11,691,167	19,729,851
1911	8,446,061	10,168,164	18,614,225
1912	8,451,197	10,598,139	19,049,336
1913	9,400,605	11,579,459	20,980,064
1914	9,568,383	11,896,113	21,464,496
1915	9,475,504	12,185,017	21,660,521
1916	10,364,918	14,080,866	24,445,784
Dec. 31, 1916	10,318,950	14,101,475	24,420,425
Dec. 31, 1917	10,065,219	14,622,347	24,687,566

[1] Statement compiled from the Annual Reports on the Statistics of Railways in the United States, by the Statistical Division of the Interstate Commerce Commission.

[2] Includes returns for Classes I, II, and III roads, but excludes switching and terminal companies. Returns for other years cover Class I roads only, representing originated tonnage in excess of 90 per cent of total.

Exhibit II.

Estimated percentages of soft and hard winter, soft and hard common spring, and durum wheat grown in the 36 leading wheat-producing States in the United States.[1]

(Crop of 1918.)

State.	Winter.		Spring.		
			Common.		Durum.
	Soft.	Hard.	Soft.	Hard.	
New York	89			11	
New Jersey	100				
Pennsylvania	99			1	
Delaware	100				
Maryland	100				
Virginia	100				
West Virginia	100				
North Carolina	100				
South Carolina	100				
Georgia	100				
Ohio	94	5		1	
Indiana	94	6			
Illinois	76	22		2	
Michigan	85	9		6	
Wisconsin	12	10		75	3
Minnesota	1	3		92	4
Iowa	6	30	12	50	2
Missouri	94	6			
North Dakota				71	29
South Dakota		2		78	20
Nebraska	2	80	2	13	3
Kansas	15	85			
Kentucky	100				
Tennessee	100				
Texas	73	25		1	1
Oklahoma	16	84			
Arkansas	99	1			
Montana	3	37	5	40	15
Wyoming		25	10	37	28
Colorado	4	53	5	33	5
Utah	44	14	38	2	2
Nevada	6	18	44	30	2
Idaho	30	22	34	12	2
Washington	21	7	67	5	
Oregon	57	22	5	16	
California	62	[2] 25	12	1	

[1] Furnished by the Office of Cereal Investigations, Department of Agriculture. [2] Hard white.

Exhibit III.

Progress of population, wheat crop, and flour production for different sections indicated by percentage relations to totals for the United States.

	1899	1904	1909	1914	1919
United States:					
Population	74,798,612	82,601,384	90,691,354	98,784,340	106,877,895
Wheat crop [1] ..... bushels	621,277,375	620,094,787	660,689,420	794,888,000	831,580,667
Flour production [2] ..... barrels	99,763,777	104,013,278	105,756,645	116,403,770	121,156,373
Wheat consumption by mills, bushels	471,306,986	494,095,083	496,480,314	545,728,431	539,058,000
Northwestern Flour Selling Area: [3]					
Population ..... per cent	3.0	3.2	3.3	3.4	3.5
Wheat crop ..... do	20.6	21.4	22.6	22.7	17.4
Flour production ..... do	23.9	24.4	23.6	25.9	26.8
Wheat consumption by mills, per cent	23.0	23.8	23.1	25.4	27.0

[1] Average of three years' crops ending with given year.
[2] Flour production figures are for merchant mills as reported by the Census Bureau for 1899, 1904, 1909, and 1914; Grain Corporation's estimates for 1919.
[3] Montana, North Dakota, and Minnesota.

Progress of population, wheat crop, and flour production for different sections indicated by percentage relations to totals for the United States—Continued.

	1899	1904	1909	1914	1919
Southwestern Flour Selling Area: [4]					
Population.....per cent..	8.5	8.5	8.5	8.5	8.6
Wheat crop.....do....	18.0	26.4	24.2	30.8	27.1
Flour production.....do....	12.9	16.8	19.9	19.5	22.0
Wheat consumption by mills, per cent.....	13.0	16.9	19.6	19.5	21.8
Pacific Flour Selling Area: [5]					
Population.....per cent..	1.4	1.8	2.3	2.6	2.9
Wheat crop.....do....	7.2	7.3	8.9	10.3	7.9
Flour production.....do....	3.9	4.9	4.3	5.3	7.2
Wheat consumption by mills, per cent.....	4.0	4.7	4.3	5.3	7.2
Eastern Flour Buying Area: [6]					
Population.....per cent..	27.0	27.4	27.8	28.0	28.3
Wheat crop.....do....	6.6	5.9	6.0	4.3	5.0
Flour production.....do....	10.6	10.2	10.8	11.3	9.8
Wheat consumption by mills, per cent.....	10.5	10.1	10.7	11.2	9.7
Southern Flour Buying Area: [7]					
Population.....per cent..	19.8	19.8	19.7	19.7	19.6
Wheat crop.....do....	3.2	3.9	2.4	3.0	4.3
Flour production.....do....	4.5	4.9	4.6	4.9	4.8
Wheat consumption by mills, per cent.....	4.6	5.0	4.7	4.9	4.8
Central Neutral Area: [8]					
Population.....per cent..	24.5	23.8	23.0	22.4	21.8
Wheat crop.....do....	30.0	24.4	25.8	20.2	27.8
Flour production.....do....	30.7	26.2	24.9	21.8	17.9
Wheat consumption by mills, per cent.....	31.3	26.8	25.2	22.0	18.0
Southeastern Neutral Area: [9]					
Population.....per cent..	9.9	9.4	8.9	8.6	8.2
Wheat crop.....do....	7.5	5.1	5.6	4.9	5.2
Flour production.....do....	8.8	8.3	8.4	7.8	6.7
Wheat consumption by mills, per cent.....	9.0	8.4	8.7	7.9	6.7
California (Western Neutral Area):					
Population.....per cent..	2.0	2.2	2.5	2.8	3.0
Wheat crop.....do....	4.4	3.3	1.9	.7	1.3
Flour production.....do....	2.7	2.4	1.7	1.5	2.6
Wheat consumption by mills, per cent.....	2.7	2.4	1.8	1.8	2.7
Colorado (Western Neutral Area):					
Population.....per cent..	.7	.8	.9	.9	1.0
Wheat crop.....do....	.9	1.0	1.1	1.3	1.8
Flour production.....do....	1.0	.9	.9	1.1	1.2
Wheat consumption by mills, per cent.....	1.0	.9	.9	1.1	1.2
Eastern Small Production Area: [10]					
Population.....per cent..	2.2	2.0	1.9	1.8	1.7
Wheat crop.....do....	.2	.3	.3	.3	.3
Flour production.....do....	.3	.3	.2	.2	.2
Wheat consumption by mills, per cent.....	.2	.3	.3	.2	.1
Western Small Production Area: [11]					
Population.....per cent..	1.0	1.1	1.2	1.3	1.4
Wheat crop.....do....	1.4	1.0	1.2	1.5	1.9
Flour production.....do....	.7	.7	.7	.7	.8
Wheat consumption by mills, per cent.....	.7	.7	.7	.7	.8

[4] Nebraska, Kansas, Missouri, and Oklahoma.
[5] Washington, Oregon, and Idaho.
[6] Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and West Virginia.
[7] North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, and Texas.
[8] South Dakota, Iowa, Wisconsin, Illinois, Michigan, Indiana, and Ohio.
[9] Kentucky, Tennessee, Virginia, District of Columbia, and Maryland.
[10] Delaware, New Hampshire, Maine, and Vermont.
[11] Utah, Wyoming, New Mexico, Arizona, and Nevada.

Exhibit IV.

MILLERS' ASSOCIATIONS AND MILLERS' CLUBS.

Millers' National Federation.

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President, A. L. Goetzmann, La Crosse, Wis.
First vice president, C. M. Hardenbergh, Kansas City, Mo.
Second vice president, Henry M. Allen, Troy, Ohio.
Treasurer, W. L. Phelps, Chicago, Ill.
Secretary, A. P. Husband, Chicago, Ill. (160 West Jackson Boulevard).

EXECUTIVE COMMITTEE.

Officers named above and the following:
E. C. Andrews, Kehlor Flour Mills Co., St. Louis, Mo., chairman committee on grain standardization and inspection.
B. W. Marr, chairman committee on finance and membership.
William G. Crocker, chairman special legislative committee on commercial feeding stuffs law.
Franklin Edwards, Marshall Milling Co., Marshall, Minn., chairman committee on crop improvements.
C. B. Jenkins, chairman committee on millers' mutual insurance.
Thomas L. Moore, chairman committee on legislation.
Charles T. Olson, Bay State Milling Co., Winona, Minn., chairman committee on package differentials, sales contracts, trade-marks, publicity.
B. J. Rothwell, Bay State Milling Co., Boston, Mass., chairman committee on export trade.
Fred N. Rowe, Valley City Milling Co., Grand Rapids, Mich., chairman committee on arbitration.
James C. Andrews, Yerxa, Andrews & Thurston (Inc.), Minneapolis, Minn., chairman committee on transportation.

EXPORT AGENT.

F. H. Price, New York, N. Y.

OFFICIAL COUNSEL.

Frank F. Reed and Edward S. Rogers, Chicago, Ill.

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T. S. Blish, Blish Milling Co., Seymour, Ind.
G. A. Breaux, Ballard & Ballard Co., Louisville, Ky.
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Guy W. Everett, Everett, Aughenbaugh & Co., Waseca, Minn.
O. D. Fisher, Fisher Flouring Mills Co., Seattle, Wash.
J. L. Grigg, Eagle Milling Co., Sparta, Ill.
C. M. Hardenbergh, Southwestern Milling Co., Kansas City, Mo.
W. L. Harvey, New Prague Flouring Mill Co., New Prague, Minn.
H. S. Helm, Russell-Miller Milling Co., Minneapolis, Minn.
J. B. Hupp, Kansas Flour Mills Co., Wichita, Kans.

C. B. Jenkins, Noblesville Milling Co., Noblesville, Ind.
E. M. Kelly, Liberty Mills, Nashville, Tenn.
Joseph Le Compte, Lexington Roller Mills, Lexington, Ky.
A. C. Loring, Fillsbury Flour Mills Co., Minneapolis, Minn.
B. W. Marr, Gwinn Milling Co., Columbus, Ohio.
S. B. McNear, Sperry Flour Co., San Francisco, Calif.
A. Mennel, Mennel Milling Co., Toledo, Ohio.
George S. Milnor, Sparks Milling Co., Alton, Ill.
Thomas L. Moore, Dunlop Mills, Richmond, Va.
W. L. Phelps, Star & Crescent Milling Co., Chicago, Ill.
E. S. Rea, Rea-Patterson Milling Co., Coffeyville, Kans.
Charles L. Roos, Hunter Milling Co., Wellington, Kans.
B. B. Sheffield, Big Diamond Mills Co., Minneapolis, Minn.
George G. Sohlberg, Acme Milling Co., Oklahoma City, Okla.
Walter Stern, Bernhard Stern & Sons, Milwaukee, Wis.
D. E. Stott, David Stott Flour Mills, Detroit, Mich.
George P. Urban, The George Urban Milling Co., Buffalo, N. Y.

EX OFFICIO (EX-PRESIDENTS).

B. A. Eckhart, B. A. Eckhart Milling Co., Chicago, Ill.
Charles Espenschied, St. Louis, Mo.
W. E. Castle, St. Louis, Mo.
Dwight M. Baldwin, Baldwin Flour Mills, Minneapolis, Minn.
Hosea B. Sparks, Sparks Milling Co., Alton, Ill.
Mark N. Mennel, Mennel Milling Co., Toledo, Ohio.
Samuel Plant, Geo. P. Plant Milling Co., St. Louis, Mo.
Fred J. Longham, Federal Milling Co., Lockport, N. Y.
E. M. Kelly, Liberty Mills, Nashville, Tenn.

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Vice president, Geo. W. Ring, Edinburg, Va.
Secretary and treasurer, E. H. Sherwood, 230 South Wells Street, Chicago, Ill.

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S. B. Ray, Gamaliel, Ky.
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S. S. Stevenson, Arcanum, Ohio.
H. G. Young, Zanesville, Ohio.

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Vice president, E. M. Friend, Terrell, Tex.
Treasurer, W. C. Dunn, Independence, Mo.
Secretary, Hugo Roos, Kansas City, Mo.

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Above-named officers and the following:
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F. J. Becker, Dickinson, Tex.
Louis R. Henkle, Lawrenceburg, Ind.
A. W. Spehr, St. Paul, Minn.
B. C. Williams, Detroit, Mich.
Frank C. Witter, Denver, Colo.

The Millers' Export Association (Inc.).

[Activities discontinued.]

OFFICERS.

President, W. L. Sparks, Sparks Milling Co., Terre Haute, Ind.
First vice president, Chas. L. Roos, Hunter Milling Co., Wellington, Kans.
Second vice president and general manager, R. F. Bausman, Millers' Export Association (Inc.), 105 Produce Exchange, New York, N. Y.
Treasurer, Frank F. Henry, Washburn-Crosby Co., Buffalo, N. Y.
Secretary, Chauncy Abbot, jr., Omaha Flour Mills Co., Omaha, Nebr.
Assistant Secretary, Alex. Pound, Millers' Export Association (Inc.), New York, N. Y.

DIRECTORS.

H. S. Helm, Russell-Miller Milling Co., Minneapolis, Minn.
Frank B. Rice, Star and Crescent Milling Co., Chicago, Ill.
C. Powell Smith, J. Allen Smith & Co., Knoxville, Tenn.

ZONE EXECUTIVE COMMITTEES.

Eastern zone:
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Fred E. Pond, zone manager, Chamber of Commerce, Buffalo, N. Y.
J. G. Davis, J. G. Davis Co., Rochester, N. Y.
W. B. Hamilton, William Hamilton & Son, Caledonia, N. Y.
F. J. Lingham, Federal Milling Co., Lockport, N. Y.
B. J. Rothwell, Bay State Milling Co., Boston, Mass.

Southern zone:
J. W. Morrison, chairman and zone manager, Lexington Roller Mills, Lexington, Ky.
E. M. Kelly, Liberty Mills, Nashville, Tenn.
I. C. Klepper, Louisville Milling Co., Louisville, Ky.
E. E. Lawrance, Dunlop Milling Co., Clarksville, Tenn.
J. W. Ring, Model Mills, Johnson City, Tenn.

Central zone:
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L. E. Rice, zone manager, Star and Crescent Milling Co., Chicago, Ill.
Geo. A. Amendt, Amendt Milling Co., Monroe, Mich.
A. V. Imbs, Imbs Milling Co., St. Louis, Mo.
L. A. Mennel, Mennel Milling Co., Toledo, Ohio.

Zone 3 has been subdivided. Mills in Michigan, Indiana, Ohio, and West Virginia are under the direction of Zone Manager H. G. Spear, Comstock Building, Columbus, Ohio.

Northwestern zone:
J. S. Pillsbury, chairman, Pillsbury Flour Mills Co., Minneapolis, Minn.
Dwight M. Baldwin, zone manager, Baldwin Flour Mills, Minneapolis, Minn.
C. C. Bovey, Washburn-Crosby Co., Minneapolis, Minn.

W. L. Harvey, International Milling Co., New Prague, Minn.
B. B. Sheffield, Big Diamond Milling Co., Minneapolis, Minn.
Southwestern zone:
J. B. Hupp, chairman, Kansas Flour Mills Co., Wichita, Kans.
C. V. Topping, zone manager, 907 New York Life Building, Kansas City, Mo.
W. B. Dunwoody, Brand-Dunwoody Milling Co., Joplin, Mo.
J. C. Mytinger, Wichita Mill & Elevator Co., Wichita Falls, Tex.
H. G. Randall, Midland Milling Co., Kansas City, Mo.
T. C. Thatcher, Oklahoma City Mill & Elevator Co., Oklahoma City, Okla.

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Secretary, Fred W. Colquhoun, Chicago, Ill.
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Millers' Exchange (Kansas City, Mo.).

Attorney in fact and general manager, Charles F. Rock, Kansas City, Mo.

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R. Sam Hays, Sweet Springs, Mo.
Theo. Ismert, Kansas City, Mo.
S P. Kramer, Topeka, Kans.
Geo. S. Milnor, Alton, Ill.
John H. Moore, Wichita, Kans.
Chas. L. Roos, Wellington, Kans.

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Second vice president, S. P. Kramer, Topeka, Kans.
Treasurer, H. G. Randall, Kansas City, Mo.
Secretary-traffic manager, C. V. Topping, 907–908 New York Life Building, Kansas City, Mo.
Chairman of traffic committee, H. Dittmer, El Reno, Okla.
Commerce counsel, E. H. Hogueland.

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C. L. Aller, Crete, Nebr.
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J. W. Craver, St. Joseph, Mo.
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J. R. Forsyth, Denver, Colo.
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OFFICERS.

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Vice president, E. O. McCoy, The Dalles, Oreg.
Secretary, W. C. Tiffany, Seattle, Wash.

South Pacific Millers' Association.

OFFICERS.

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Vice president, Ellis Hart, Petaluma, Calif.
Secretary and treasurer, R. C. Mason, San Francisco, Calif.

DIRECTORS.

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Indiana: Indiana Millers' Association. Secretary and treasurer, Charles B. Riley, Indianapolis, Ind.

Kansas: Southern Kansas Millers' Club. Secretary, F. D. Stevens, Wichita, Kans.
Kentucky: Central Kentucky Millers' Association. Secretary and treasurer, John D. Allen, Lexington, Ky.
Michigan: Michigan State Millers' Association. Secretary, F. B. Drees, Lansing, Mich.
Minnesota:
Southern Minnesota Mills. C. E. Vandenover, Minneapolis, Minn.
Minnesota Millers' Club. Secretary, L. H. Pinney, Minneapolis, Minn.
Missouri: Southwestern Missouri Millers' Association. Secretary, J. S. Flautt, Aurora, Mo.
Montana: Montana Millers' Association. Secretary and treasurer, S. B. Fairbank, Hobson, Mont.
Nebraska: Nebraska Millers' Association. Secretary, J. N. Campbell, Omaha, Nebr.
New York: New York State Millers' Association. Secretary, Fred E. Pond, Buffalo, N. Y.
Ohio: Ohio Millers State Association. Secretary and treasurer, Frank H. Tanner, Columbus, Ohio.
Oklahoma: Oklahoma Millers' Association. Secretary and treasurer, Gerome V. Topping, Oklahoma City, Okla.
Pennsylvania:
Pennsylvania Millers' State Association. Secretary, J. F. Isenberg, Huntington, Pa.
Pennsylvania Millers' Export Association. Secretary, Thomas K. Sharpless, 524 Bourse Building, Philadelphia.
South Dakota: South Dakota and Southwestern Minnesota Millers' Club. Secretary and treasurer, Charles A. Lum, Aberdeen, S. Dak.
Utah, Idaho: Utah-Idaho Millers' and Grain Dealers' Association. Secretary, Hyrum Bennion, jr., Murray, Utah.
Tennessee: Southeastern Millers' Association. Secretary, J. B. McLemore, Nashville, Tenn.
Virginia: Virginia Wheat Millers' Club. Secretary, M. Kivlighan, Staunton, Va.
Wisconsin: Wisconsin State Millers' Association. Secretary and treasurer, C. H. Hooker, Wausau, Wis.
Baltimore Flour Club. Secretary, R. E. McCosh.
Boston Flour & Grain Club. Secretary and treasurer, Seth Catlin, jr.
Buffalo Flour Club. Secretary and treasurer, F. A. Dirnberger.
Chicago Flour Men's Club. Secretary and treasurer, Fred W. Colquhoun.
Cleveland Flour Club. Secretary, C. W. Fairchild.
Kansas City Flour & Feed Club. Secretary, Robert E. Sterling.
Kansas City Millers' Club. Secretary, Robert E. Sterling.
Minneapolis: The Millers' Club. Secretary and treasurer, Robert T. Beatty.
New York Flour Club (Inc.). Secretary, Walter Quackenbush.
Philadelphia Flour Club. Secretary, William J. Rardon.
St. Louis, Flour Trade Association of. Secretary and treasurer, David N. Sosland.
St. Louis Millers' Club. Secretary and treasurer, Frank E. Eichler.
San Francisco Flour Trade. Secretary and treasurer, W. F. Williams.

Exhibit V.

Proportion of hard and soft wheat used by certain mills in different localities, crop year 1916–17.

Location.	Hard wheat.	Soft wheat.
Minnesota mills:	*Per ct.*	*Per ct.*
1	100	.....
2	100	.....
3	100	.....
4	100	.....
5 [1]	100	.....
6	100	.....
7	100	.....
8	100	.....
9	100	.....
10 [1]	98	2
11 [1]	100	.....
Average for group	[2] 100	.....
Kansas and Missouri mills: [3]		
1	100	.....
2	100	.....
3	33	67
4	67	33
5	100	.....
6 [1]	100	.....
7	100	.....
8	100	.....
9	.....	100
10	98	2
11 [1]	100	.....
12 [1]	100	.....
13	94	6
14	100	.....
15	75	25
16	80	20
17 [1]	30	70
18 [1]	80	20
Average for group	88	12

Location.	Hard wheat.	Soft wheat.
Mills east of the Mississippi River:	*Per ct.*	*Per ct.*
1	65	35
2 [1]	67	33
3	67	33
4	30	70
5	.....	100
6	17	83
7	15	85
8	100	.....
9	70	30
10	90	10
11 [1]	100	.....
12 [1]	100	.....
13	100	.....
14	67	33
15 [1]	88	12
16 [1]	85	15
17 [1]	30	70
18	30	70
19	15	85
20	.....	100
Average for group	49	51
Washington and Oregon mills:		
1	.....	100
2	25	75
3	10	90
4	70	30
5	50	50
6	25	75
7	5	95
Average for group	15	85

[1] Crop year 1917–18.
[2] Exact average, 99.059. Three or four of these mills reported that in years when the hard-wheat supply was short and of poor quality they had used as much as 15 per cent of soft wheat. The results were unsatisfactory.
[3] Including one Oklahoma mill.

EXHIBIT VI.

Quality and weight of wheat by States, crop years 1912–1918.[1]

	Quality (per cent of normal).							Weight per measured bushel (pounds).						
	1912	1913	1914	1915	1916	1917	1918	1912	1913	1914	1915	1916	1917	1918
United States	90	93.2	89.7	88.4	87.0	92.4	93.1	58.3	58.7	58.0	57.9	57.1	58.5	58.8
Northwestern Flour Selling Area:														
Montana	94	94	92	96	90	82	93	60	60.1	59.7	60.5	59.1	58.2	59.2
North Dakota	89	93	77	91	53	95	96	58	58.0	54.5	58.0	46.8	58.6	59.6
Minnesota	86	92	70	91	61	94	96	56	57.0	53.1	58.0	49.7	58.0	58.2
Southwestern Flour Selling Area:														
Nebraska	96	93	92	87	98	93	88	60	59.6	59.2	57.0	59.8	58.8	57.9
Kansas	93	92	92	80	95	92	90	58	58.1	58.0	56.0	58.0	57.9	58.0
Missouri	88	96	94	78	80	94	94	58	59.2	59.0	57.0	56.5	58.8	59.0
Oklahoma	84	83	92	84	96	93	92	57	57.0	59.7	56.0	58.7	58.5	58.8
Pacific Flour Selling Area:														
Washington	92	94	96	95	97	84	88	59	59.0	59.7	59.3	59.8	57.1	57.1
Oregon	96	97	95	90	97	83	90	60	60.1	59.4	58.9	60.6	58.3	58.9
Idaho	94	94	91	95	92	89	93	60	59.9	59.7	59.8	59.7	58.5	59.3
Eastern Flour Buying Area:														
Massachusetts														
Rhode Island														
Connecticut														
New York	96	96	94	94	92	93	92	59	59.5	59.7	59.6	58.5	59.5	59.6
New Jersey	91	93	85	93	91	90	94	60	59.0	59.0	59.5	59.1	59.1	59.5
Pennsylvania	92	90	92	94	93	94	94	60	59.7	59.7	59.9	59.5	59.5	60.0
West Virginia	94	91	95	96	90	94	95	60	59.0	59.9	60.2	59.6	59.9	59.9
Southern Flour Buying Area:														
North Carolina	84	95	94	91	88	93	75	58	59.5	59.5	59.1	59.0	59.8	57.0
South Carolina	80	92	90	89	87	90	88	58	59.5	59.5	59.6	59.5	59.4	59.2
Georgia	78	92	92	88	89	89	89	56	58.8	58.7	58.2	58.6	58.6	58.5
Florida														
Alabama	84	89	92	90	80	90	88	58	58.5	59.0	58.7	58.2	58.3	58.2
Mississippi	85	87	90	92	84	89	86	59	58.3	59.2	58.6	56.5	58.2	57.0
Louisiana														
Arkansas	85	91	89	86	85	95	89	58	58.5	58.0	57.0	57.8	58.1	57.0
Texas	88	89	78	90	93	96	85	56	58.0	56.0	57.6	58.2	59.0	58.0
Central Neutral Area:														
South Dakota	88	91	72	89	61	94	96	59	58.0	52.9	57.6	47.9	58.3	58.8
Iowa	93	94	90	84	89	94	93	59	58.3	57.9	57.4	57.3	58.0	58.1
Wisconsin	88	92	86	94	85	93	95	58	58.9	56.9	59.9	57.1	59.1	59.0
Illinois	79	96	95	86	86	93	96	56	59.0	58.7	57.5	57.0	57.8	59.1
Michigan	78	94	94	91	92	90	87	57	58.8	59.5	58.5	58.4	58.9	59.4
Indiana	77	97	95	86	89	94	96	56	58.5	59.3	57.4	57.1	58.3	58.9
Ohio	82	95	96	90	90	95	95	56	59.0	59.3	58.5	58.5	59.0	59.5
Southeastern Neutral Area:														
Kentucky	82	96	97	82	90	94	91	57	59.0	59.4	57.5	58.0	58.7	58.6
Tennessee	86	96	96	84	83	94	86	58	59.0	59.0	58.0	57.0	58.4	58.0
Virginia	88	93	94	95	86	91	88	59	59.5	59.1	60.4	59.5	59.0	59.0
District of Columbia														
Maryland	88	87	94	92	87	86	94	60	59.5	60.0	59.5	59.0	59.1	60.0
California	89	87	92	83	89	94	85	59	58.0	59.2	57.5	59.0	59.2	58.2
Colorado	94	92	94	91	92	94	92	60	59.4	59.1	58.9	59.3	59.5	58.0
Eastern Neutral Small Production Area:														
Delaware	92	90	96	88	86	89	94	59	58.5	60.0	59.0	58.0	59.0	60.0
New Hampshire														
Maine	90	97	97	97	97	79	96	59	60.5	60.0	61.0	58.5	58.7	60.0
Vermont	87	92	92	97	90	90	93	60	59.0	59.0	59.5	58.5	58.0	59.0
Western Neutral Small Production Area:														
Utah	97	95	94	94	92	92	95	61	61.6	60.6	61.0	60.9	59.7	60.5
Wyoming	94	95	92	97	92	91	98	60	60.2	59.9	60.4	59.6	60.1	60.0
New Mexico	92	90	95	93	93	93	91	60	59.5	59.5	58.6	59.5	59.6	58.7
Arizona	95	95	95	95	95	88	95	60	61.0	60.2	59.0	58.5	58.5	60.0
Nevada	95	97	97	93	95	98	92	60	60.3	59.8	60.4	59.4	60.0	59.7

[1] Data furnished by the Department of Agriculture.

Exhibit VII.

Analyses of the cost of making and selling a barrel of wheat flour, by groups and by years, 1913–14 to 1917–18.

NORTHWESTERN GROUP.

Items of cost.	1913–14	1914–15	1915–16	1916–17	1917–18
Wheat	$3.90	$5.52	$4.99	$8.55	$9.61
Packages	.27	.23	.25	.32	.46
Mill operating costs	.20	.21	.20	.26	.37
General and selling expense	.30	.34	.31	.44	.42
Total cost of flour and feed	4.67	6.30	5.75	9.57	10.86
Charged to production of feed	.71	.82	.74	1.28	1.25
Net cost of flour per barrel[1]	3.98	5.48	5.01	8.29	9.61
Mill operating costs:					
Mill labor, power, and miscellaneous operating costs	.15	.15	.15	.20	.28
Repairs	.02	.03	.02	.03	.06
Depreciation[2]	.03	.03	.03	.03	.03
Total	.20	.21	.20	.26	.37
Total operating, general and selling costs[3]	.50	.55	.51	.70	.79

SOUTHWESTERN GROUP.

Wheat	$3.90	$4.90	$4.97	$7.56	$9.77
Packages	.26	.22	.22	.28	.48
Mill operating costs	.26	.25	.25	.28	.36
General and selling expense	.25	.25	.24	.31	.36
Total cost of flour and feed	4.67	5.62	5.68	8.43	10.97
Charged to production of feed	.83	.83	.82	1.15	1.37
Net cost of flour per barrel[1]	3.84	4.79	4.86	7.28	9.60
Mill operating costs:					
Mill labor, power and miscellaneous operating costs	.20	.19	.19	.21	.27
Repairs	.02	.02	.02	.03	.05
Depreciation[2]	.04	.04	.04	.04	.04
Total	.26	.25	.25	.28	.36
Total operating, general and selling costs[4]	.51	.50	.49	.59	.72

EASTERN GROUP.

Wheat	$4.28	$5.50	$5.63	$8.16	$10.15
Packages	.29	.25	.25	.32	.47
Mill operating costs	.27	.25	.25	.34	.37
General and selling expense	.34	.32	.35	.44	.41
Total cost of flour and feed	5.18	6.32	6.48	9.26	11.40
Charged to production of feed	.93	.94	.90	1.29	1.39
Net cost of flour per barrel[1]	4.25	5.38	5.58	7.97	10.01
Mill operating costs:					
Mill labor, power and miscellaneous operating costs	.21	.19	.19	.27	.28
Repairs	.02	.02	.02	.03	.05
Depreciation[2]	.04	.04	.04	.04	.04
Total	.27	.25	.25	.34	.37
Total operating, general and selling costs[5]	.61	.57	.60	.78	.78

[1] Based on barrels of flour produced.
[2] Actual figures, Northwestern group, $0.0284; Southwestern group, $0.0361; Eastern group, $0.0420.
[3] These costs do not include interest charges amounting to 2 cents in 1914, 3 cents in 1915, 2 cents in 1916, 4 cents in 1917, and 3 cents in 1918.
[4] These costs do not include interest charges amounting to 3 cents in 1914, 2 cents in 1915, 2 cents in 1916, 4 cents in 1917, and 4 cents in 1918.
[5] These costs do not include interest charges amounting to 4 cents in 1914, 4 cents in 1915, 3 cents in 1916, 7 cents in 1917, and 5 cents in 1918.

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